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American Society for Steel Treating

Brief History of Developments Leading Up to Its Formation—A National Research Laboratory —Second Annual Convention and Exhibition

BY EDWIN F. CONE

THE development and rapid growth of the American Steel Treaters' Society has been a prominent feature of the recent history of American technical societies. From small beginnings only two years ago, this organization has taken its place among the larger societies until to-day it comprises an aggregation of local chapters situated in many of the leading cities of the country, as well as one in Canada, and comprising among its membership metallurgists and steel-treating experts in the iron, steel and metal working industries.

While the growth has been phenomenal on the surface, the explanation is readily deduced. The application of electricity to the steel industry in general as a source of heat energy has made possible the production of a large number of ferroalloys, which in turn have given rise to the production of numerous alloy steels. The manufacture of such steels, containing chromium, nickel, vanadium, tungsten, molybdenum, uranium, cobalt, etc., in various combinations has been made possible on an extensive scale.

COL. A. E. WHITE

W. H. EISENMAN

President and Secretary of American Society for Steel Treating

Such steels, as well as plain carbon steels, have been brought to their greatest degree of usefulness and reliability primarily by the application to them of various heat-treating processes and apparatus. The expansion in the automotive industry as well as the production of high quality steels, light in weight, has been accelerated. Increased efficiency in the tool-steel industry has also resulted. The consequence has been a widespread demand for steel heat-treating appliances and for men skilled in heat-treating methods and for research work.

The early history of the formation of the American Steel Treaters' Society is related substantially as follows: In the early part of September, 1918, a few interested men mailed a letter to others in and about Chicago, suggesting the formation of a society for the study and development of the art of heat treating steel and asking them to attend a dinner at the City Club, that city, on Sept. 18, to discuss the project. This letter brought an enthusiastic response which resulted in an organization and the election of officers.

Immediately thereafter the officers met, established certain committees and appointed men to fill them. It was decided that the first and greatest service to be given was the publication of a magazine which would provide for a permanent record of the society's activities and progress and furnish also to each member valuable technical information. The first issue of the *Journal* appeared in October, 1918, and it has been published monthly ever since, except in July and August. Without a sample copy the promoters succeeded in securing about $450 worth of advertising, collectable 30 days after the issue. There were 4000 copies of the first issue printed.

Soon after this, the work connected with handling the society's affairs became so great that it was decided to employ a business manager, the secretary then being A. G. Henry, metallurgist, Illinois Tool Works, Chicago, and the president, T. E. Barker, production engineer, Miehle Printing Press & Mfg. Co., also of Chicago. One of the applicants for the position, after studying the society's affairs, presented a budget for the first year's activities which was of somewhat staggering proportions. The man who was selected, William H. Eisenman, said at the time:

> I have examined your affairs. I have unlimited confidence in the future development of your society, so much so that I shall be glad to cast my lot with yours and let my salary depend upon the results attained, you to name it. The work appeals to me and I feel

T. E. BARKER
Vice-President for Two Years

that I can contribute largely to the realization of the objects which you have in view.

Aside from the fact that his previous experiences well qualified him for the position, his unbounded enthusiasm appealed to the officers, and, as subsequent developments have shown, no mistake was made in the selection. It is to the credit of this former business manager and present executive secretary that the new organization has grown to its present size and importance. The principle was recognized that, to a society of its nature, competent business management is as essential as to an industrial enterprise.

The new business manager set about organizing local chapters in various centers, the method pursued being a visit to such cities, the selection and acquaintance of the right men in the local industries, the calling of an informal meeting or dinner of a few so-called charter members, the launching of the local chapter with a public meeting of all interested in heat treatment in any of its phases.

To Cleveland belongs the honor of first nurturing a local chapter. This was in January, 1919. Then came Pittsburgh on Feb. 24, with Milwaukee on March 5. Philadelphia joined the new society on March 21, followed by Cincinnati on April 18, Buffalo on May 9, Rochester, N. Y., on May 12 and New York City on May 23, 1919. Within three months and five days, eight chapters were organized.

W. S. BIDDLE
Treasurer of the Society

Then came the organization's first national convention and exhibition at Chicago during the week of Sept. 22, 1919. It was featured by an array of papers that would have been creditable to a much older society and by an exhibition of steel-treating appliances, processes and products which excited the admiration of experienced technical convention and exhibition promoters.

Since that convention 11 more chapters have been organized as follows:

North West Chapter, Minneapolis.
Tri-City Chapter, Rock Island, Ill.
St. Louis Chapter, St. Louis.
Lehigh Valley Chapter, Easton, Pa.
New Haven Chapter, New Haven, Conn.
Providence Chapter, Providence, R. I.
Springfield Chapter, Springfield, Mass.
Bridgeport Chapter, Bridgeport, Conn.
Boston Chapter, Boston.
Baltimore Chapter, Baltimore.
Toronto Chapter, Toronto, Can.

This brings the total to 20. The Detroit territory will be represented by a chapter there when the amalgamation of the Steel Treating Research Society, already authorized, takes effect next week. Each chapter has, as officers and executive committees, men identified with the leading industries in the steel and metal-working fields in the respective territories.

Some years ago there was organized in Detroit a technical society under the title Steel Treating Research Society. This never developed its activities outside of that particular territory, which is one of the most important ones in the country. Automobile companies are extensive users of heat-treating processes and equipment. One of the notable developments of the past year has been the successful campaign for the amalgamation of this society with the larger but newer organization. It has been a matter of general satisfaction that this was brought about, thus eliminating any likelihood of rivalry and insuring full co-operation for the science as a whole. The Steel Treating Research Society has joined the American Steel Treaters' Society in its convention and exhibition next week in Philadelphia and the first days' sessions will complete the amalgamation of the two societies into the American Society for Steel Treating.

The result of the ballot on amalgamation showed that but 34 were cast against the amalgamation, and consequently, by the adoption of the constitution therewith submitted, the nomintaing committee provided for in that report held a meeting in Pittsburgh and recommended the election of the following officers:

For president, one year: Col. A. E. White, professor chemical engineering, University of Michigan, Ann Arbor, Mich.

For vice-president, one year: T. D. Lynch, research engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

For vice-president, two years: T. E. Barker, production engineer, Miehle Printing Press & Mfg. Co., Chicago.

For secretary, two years: W. H. Eisenman, 208 North Wabash Avenue, Chicago.

For treasurer, one year: W. S. Biddle, president W. S. Biddle Co., 1411 East Forty-fifth Street, Cleveland.

For directors, two years: Howard J. Stagg, assistant manager Halcomb Steel Co., Syracuse, N. Y.; E. J. Janitzky, metallurgist Illinois Steel Co., South Chicago, Ill.

For directors, one year: A. F. MacFarland, metallurgist Vanadium Alloys Steel Co., Latrobe, Pa.; W. C. Peterson, metallurgist Packard Motor Car Co., Detroit.

The ballots have been prepared and sent out to the active members of both societies and will be turned over to the tellers of election on the first day of

H. J. STAGG
Director for One Year

the convention in Philadelphia, Sept. 14. Both societies will continue to function independently until the first day of the convention.

One of the latest developments in the organization's plans is that negotiations are under way between the amalgamation committee, which for the time being is acting in the interest of both societies, and the United States Department of the Interior with reference to the establishment of a national research laboratory in the Bureau of Mines Building at Pittsburgh. If these plans mature—and there is good reason to expect they will—a laboratory devoted exclusively to research work in the art of steel treatment will be established and conducted under the supervision and at the expense of the American Society for Steel Treating. No commercial work in this laboratory will be done nor will commercial interests be allowed to influence it.

Annual Convention and Exhibition in Philadelphia

THE second annual convention and national exhibition of the American Steel Treaters' Society, in which the Steel Treating Research Society of Detroit joins, will be held in Philadelphia next week, Sept. 14 to 18, in the Commercial Museum, where the large foundrymen's exhibition was held last year. A program of over 70 papers dealing with heat-treating problems, processes and apparatus has been prepared. The exhibition proper will be participated in by over 125 nationally known firms, and over 80,000 sq. ft. of floor space will be used to display heat-treating appliances and heat-treated products. While the first exhibition at Chicago was successful beyond the expectation of its promoters, the one this year is predicted to excel that one three to one in magnitude and to be the largest of its kind ever held anywhere.

Program of the Convention

The preliminary program is as follows:

TUESDAY, SEPT. 14

Morning Session—10 *to* 12 *a. m.*—Address of welcome, Mayor Moore of Philadelphia.

Address of welcome, Col. A. E. White, chairman of the amlagamation committee.

Appointment of tellers of election.

Exhibition open 9 a. m. to 10:30 p. m.

Noonday Luncheon—The delegates from all the chapters will have a business meeting and luncheon at the Commercial Museum.

Afternoon Session—2 *to* 4:30 *p. m.*—Report of tellers of election.

Address of president-elect.

Evening Session—8 *to* 10 *p. m.*

E. J. JANITZKY
Director for Two Years

WEDNESDAY, SEPT. 15

Morning Session—10 *to* 12 *a. m.*

Noonday Luncheon—The delegates and national officers will have a business meeting and luncheon at the Commercial Museum.

Afternoon Session—2 *to* 4:30 *p. m.*

Evening Session—8 *to* 10:30 *p. m.*

Exhibition open from 9 a. m. to 10:30 p. m.

THURSDAY, SEPT. 16—"NEW YORK DAY"

Morning Session—10 *to* 12 *a. m.*

Noonday Luncheon—The delegates and national officers will have noonday luncheon at the Commercial Museum.

Afternoon Session—2 *to* 4:30 *p. m.*

Thursday Evening, 6:30 *p. m. sharp*—Informal banquet and entertainment, Grand Ball Room of the Bellevue-Stratford Hotel. Tickets, $5. Visitors and guests are invited and will be welcome. Tickets on sale at secretary's office just inside the main entrance to exhibition hall. Secure your tickets early—seating capacity limited to 800. The banqueters will be addressed by speakers of national prominence.

Exhibition open from 9 a. m. to 5 p. m.

T. D. LYNCH
Vice-President for One Year

A. F. MACFARLAND
Director for One Year

FRIDAY, SEPT. 17

The various plants in Philadelphia will be visited.

Evening Session, 8 *p. m.*—Informal dance and reception by the Philadelphia Chapter in the clover room at the Bellevue-Stratford Hotel.

Exhibition open from 9 a. m. to 5 p. m.

SATURDAY, SEPT. 18—"PHILADELPHIA DAY"

Exhibition open from 9 a. m. to 6 p. m.

The entertainment program for the ladies will be in charge of Mrs. D. K. Bullens, chairman of the ladies' entertainment committee. The headquarters will be on the mezzanine floor of the Bellevue-Stratford Hotel. The program, subject to slight revision, is as follows:

TUESDAY, SEPT. 14

Philadelphia ladies will receive out of town guests on mezzanine floor of the Bellevue-Stratford Hotel.

1.00 p. m.—Luncheon roof garden, Bellevue-Stratford Hotel.

2.30 p. m.—Sight-seeing auto tour of Philadelphia, stops being made at Independence Hall to see the Liberty Bell, Declaration Chamber, etc., and also at the United States Mint. Points of interest include historical business and residential sections, including portion of Fairmount Park.

8.00 p. m.—Theater party.

WEDNESDAY, SEPT. 15

About 10 a. m.—The ladies will leave on an all-day sight-seeing trip (auto) to Valley Forge, via Fairmount Park, Overbrook, Wynnewood, Bryn Mawr, etc. Ample time to enjoy historical Valley Forge. About noon the ladies will partake of a world-famous Pennsylvania chicken and waffle dinner at Washington Inn, Valley Forge. Sight-seeing continued, returning about 4 p.m., arriving Philadelphia, 5.30 p. m.

Evening—Moving pictures.

THURSDAY, SEPT. 16

Organ recital at Wanamaker's store at 11 o'clock and personally conducted tour of the store.

Visit the Curtis Publishing plant or trip to the Commercial Museum to inspect the exhibits.

6.30 p. m.—Shore Dinner.

8.45 p. m.—Ladies will join men in time for speeches and

entertainment of the annual banquet of the society, Grand Ball Room, Bellevue-Stratford Hotel.

FRIDAY, SEPT. 17

Personally conducted trip to the Navy Yard and visit on various destroyers, battleships and submarines and several ex-German U-Boats, or trip by boat to Chester.

8.00 p. m.—The Philadelphia Chapter will entertain with an informal reception and dance in the Clover Room of the Bellevue-Stratford Hotel.

Papers to Be Presented

The list of papers and their authors, to be presented at the convention's various technical sessions on the morning, afternoon and evening of each day is as follows:

J. D. Andrews, district manager, Brown Instrument Co., New York, "Pyrometers and Their Application to Steel Treating."

Arthur N. Armitage, Mesta Machine Co., Pittsburgh, "Pyrometers from the Standpoint of the User."

T. F. Baily, president, Electric Furnace Co., Alliance, Ohio, "Relative Economy of Electric, Oil and Gas-fired Furnaces."

Guy P. Bible, salesman, H. T. Potts & Co., Philadelphia, "Relation of the Steel Salesman to the Development of Heat Treatment."

A. Bensel, first vice-president, Driver-Harris Co., Harrison, N. J., "High Temperature-Resisting Alloys for Carbonizing."

Eric E. Bilgart, president, Pyromagnetic Instrument Co., Chicago, "The Relation of Time, Temperature, Mass and Surface to the Hardening of Carbon Steel."

James Brakes, Jr., electrical tester, Commonwealth Edison Co., Chicago, "Relative Economy of Electric, Oil, Gas and Coal-fired Furnaces."

J. A. Brown, W. S. Rockwell Co., New York, "Factors Governing Production of Heated Product."

N. E. Brown, superintendent, U. S. Electrical Mfg. Co., Los Angeles, Cal., "A Quenching Tank for Tool and Die Work."

Peter Chambers, Angelus Steel Treating Co., Redondo, Cal., "Forging Temperature of High and Low Carbon and Alloy Steel."

E. F. Collins, consulting engineer, industrial heating devices, General Electric Co., Schenectady, N. Y., "Relative Thermal Economy of Electric and Fuel Fired Furnaces, and its Influence on Process Coats and Plant Efficiency."

J. D. Cutter, Climax Molybdenum Co., New York, Topic to be announced later.

A. H. D'Arcanbal, chief metallurgist, Pratt & Whitney Co., Hartford, Conn., "Working Test of High Speed Steel."

Ed. F. Davis, Celite Products Co., New York, "The Function of Insulation in the Heat Treating of Steel."

A. K. Drury, H. A. Drury Co., Ltd., Montreal, Can., "The Heat Treatment of High Tensile Steels for Automobiles, etc."

Wm. A. Ehlers, industrial furnace engineer, American Gas Association, New York, "Fuels and Their Heat Utilization in Furnaces."

Louis A. Ellner, assistant metallurgist, H. H. Franklin Co., Syracuse, N. Y., "Proper Heat Treatment for Carburized Steel Parts made from Plain Carbon Steels of Different Carbon Content, also from the Various Alloy Steels. The Advantages of the Double Quench, and the Direct Quench from the Carburizer."

G. W. Franzheim, Supplee-Biddle Hardware Co., Philadelphia, "Heat Resisting Metals."

H. J. French, Bureau of Standards, Washington, D. C., "The Heat Treatment of a High Chromium Steel."

C. U. Geesey, chemist and metallurgist, Garford Motor Truck Co., Lima, Ohio, "The Functions of a Chemist and Metallurgist."

R. L. Gilman, experimental heat treater, Standard Steel and Bearing Co., New Haven, Conn., "Carburizing, Hardening and Tempering High Carbon Alloy Steels in One Hundred Thirty Minutes."

F. A. Hall, American Metallurgical Corporation, Philadelphia. Topic to be announced.

H. G. Hall, The Bristol Co., Chicago, "The Essentials of Modern Pyrometry."

H. H. Harris, Quigley Furnace Spec. Co., New York, "Containers Used in Heat Treatment Processes."

O. E. Harder, associate professor of metallography, University of Minnesota. Topic to be announced.

Dr. J. Culver Hartzell, Dalton Adding Machine Co., Norwood, Ohio, "The Relation of the Electric Furnace to the Fabrication of Steels with Special Reference to the Chemical and Physical Changes Produced, and the Relative Economy of the Electric Furnace and the Gas, Oil and Coal-fired Furnaces," and "The Relation of Chemistry to the Fabrication of Steels, and the Effects of Small Percentages of Zirconium, Cobalt, etc., upon the Physical Properties of Steels."

C. A. Haux, foreman, Avery Co., Peoria, Ill., "Carburizing Temperature Best Adapted to Steels of Various Carbon Contents."

O. C. Hedin, treasurer, Gopher Machine and Tool Works, Inc., Minneapolis, Minn., "Progress in Small Shop Hardening Methods."

H. E. Hemstreet, general foreman spring department, Sheldon Axle & Spring Co., Wilkesbarre, Pa., "Heat Treatment of Axle Forgings for Heavy Trucks."

R. L. Herrick, Editor, *Raw Material*, New York, "Molybdenum Steel."

V. E. Hillman, metallurgist, Crompton and Knowles Loom Works, Worcester, Mass., "The Efficiency of Various Quenching Mediums and Their Applications."

I. T. Hook, General Motors Co., Detroit, "Factors Limiting the Strength of Materials."

Carl Christian Jensen, draftsman, Mahr Mfg. Co., Minneapolis, Minn., "The Current in the Thermocouple."

Charles Morris Johnson, director research department, Crucible Steel Co., Pittsburgh, "Properties and Microstructure of Heat Treated Flame and Acid Resisting Steel."

G. W. Keller, sales manager, Brown Instrument Co., Philadelphia, "Injecting a Little Salesmanship into your Jobs as Metallurgists."

R. B. Kerr, foreman heat treating department, John Deere Harvester Works, Moline, Ill., "Hardening Die Blocks and Carburizing Thin Stock"

W. O. Kellogg, General Combustion Co., New York, "Economy in the Use of Fuel Oil."

Fred Viall Larkin, head of department of mechanical engineering, Lehigh University, Bethlehem, Pa., "Lesson learned from the Manufacture of Munitions and Ordnance in the Heat Treatments of Steels Used in Peaceful Pursuits."

H. O. Loebell, Henry L. Doherty & Co., New York, "Oxidation of Steel During the Period of Heating."

W. G. Lottes, steel expert, International Harvester Co., Chicago, "Various Quenching Mediums and Their Application."

W. H. Lyman, general superintendent, Warner Gear Co., Muncie, Ind., "Relative Economy of Electric, Oil, Gas and Coal-fired Furnaces," and "The Role of the Metallurgical Laboratory in Relation to the Inspection Department."

T. A. Lynch, research engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., "The Manufacture and Treatment of High Grade Helical Springs."

A. F. MacFarland, metallurgical engineer, Vanadium Alloys Steel Co., Latrobe, Pa. Topic to be announced.

W. H. Marble, manager, American Stainless Steel Co., Pittsburgh, "Stainless Steel."

G. S. McFarland, metallurgist, Jeffrey Mfg. Co., Columbus, Ohio, "A Research in Case-Carburizing."

F. J. McIntyre, in charge of pyrometers, Hayes Wheel Co., Jackson, Mich., "Practical Facts on Pyrometry."

Marshall Medwedeff, metallurgical engineer, Samson Tractor Co., Janesville, Wis., "The Rôle of the Metallurgical Laboratory in Relation to the Inspection Department."

J. B. Morey, foreman of annealing in wire mill, Atlas Crucible Steel Co., Dunkirk, N. Y., The Efficiency of Various Quenching Mediums with Their Practice and Application."

W. F. Newhouse, Saranac Machine Co., Benton Harbor, Mich, "Hardening Small Tool Steel Parts by the Molten Lead Process."

T. Y. Olsen, Tinius Olsen Testing Machine Co., Philadelphia, "Most Recent Developments in Testing Machines and Equipment for Metallurgical Use."

Earl W. Pierce, metallurgist, Maxwell Motor Co., Newcastle, Ind., "The Rôle of the Metallurgical Laboratory in Relation to the Inspection Department and Machine Shop."

Geo. Porteous, supervisor of forge and heat treatment, Minnesota Steel Co., Duluth, Minn., "The Substitution of Open Hearth Steel of Suitable Analysis for Crucible Tool Steel, in the Manufacture of Hand and Pneumatic Chisels, Shear Blades and Kindred Tools."

Chas. Ring, chief chemist, Ohio Steel Foundry Co.,

Springfield, Ohio, "The Annealing and Heat Treatment of Miscellaneous Steel Castings."

Henry B. Smith, metallurgist, and F. J. Olcott, foreman heat treating and forging, New Britain Machine Co., New Britain, Conn., "The Forging and Heat Treating of Chrome Nickel Steel Spindles."

E. P. Stenger, metallurgical engineer, Thompson & Black, Detroit, "The Effect of Heat Treatment on Fatigue Strength."

A. F. Stuebing, managing editor, *Railway Mechanical Engineer*, New York, "Heat Treated Parts in Locomotive Service."

O. E. Szekely, president, O. E. Szekely Co., Moline, Ill., Topic to be announced.

A. Tabachnick, Chicago, "Effect of Repeated Heat Treatment Compared to Extended Heat Treatment."

G. H. Trout, Smith Gas Engineering Co., Dayton, Ohio, "Producer Gas for Heat-Treating Furnaces."

Henry Voltman, W. S. Rockwell Co., New York, "Factors Governing the Selection of Furnaces for the Heat Treatment Operation."

D. A. Wallace, Waterloo, Iowa. Topic to be announced.

W. R. Ward, general foreman tool treatment department, Bethlehem Steel Co., Bethlehem, Pa., "A Practical Aid to the Treatment of Steels."

W. H. Wiegand, vice-president, E. J. Codd Co., Baltimore, Md., "Chain and Tubular Furnace Doors."

J. A. Wilson, president and general manager, Brooklyn Steel Treating Corp., Brooklyn, N. Y., "The Relation of the Commercial Heat Treating Plant to the Ultimate Consumer and the work of the Society in the Interests of Both."

Henry Traphagen, metallurgist, Toledo Steel Casting Co., Toledo, Ohio, "Selection of High Speed Steels for Tools."

Major A. E. Bellis, metallurgist, United States Arsenal, Springfield, Mass., "Hardening, Quenching and Tempering High Speed Steel."

H. O. Loudenbeck, engineer of materials, Union Switch & Signal Co., Swissvale, Pa. Topic to be announced.

G. R. Brophy and Miss S. B. Leiter, metallurgists, research laboratories, General Electric Co., Schenectady, N. Y., "The True Action of Cyanide in Case Hardening Steel."

R. A. Kunitz, chief engineer, Advance Furnace & Engineering Co., Springfield, Mass. Topic to be announced.

H. P. MacDonald, vice-president, Snead & Co., Jersey City, N. J., "Electrical Heat Treatment of Steel." Illustrated by moving pictures.

J. J. deBoves, president, Apex Steel Corporation, New York, "Heat Treating the Order."

C. B. Peck, associate editor, and J. C. Marsh, metallurgist, *Railway Mechanical Engineer*, Chicago, "The Field for Heat Treating Locomotive Forgings."

J. L. Thorne, metallurgist, United States High Speed Steel & Tool Corp., New York, "Heat Treatment of High Speed Steel."

Robert B. Pottinger, manager, R. B. Pottinger, Racine, Wis., "Forging, Welding, Tempering Light Steel."

Theo. G. Selleck, Alfred O. Blaich Co., Chicago, "Case-hardening."

List of Exhibitors and Their Exhibits

A

ADVANCE FURNACE & ENGINEERING CO., Springfield, Mass. Exhibiting new type of automatic furnace, also standard gas and oil furnace.

AMERICAN GAS ASSOCIATION, New York. Exhibiting photographs of the industrial use of manufactured gas, together with a few samples of machine parts heat treated in gas fired furnaces. Represented by W. A. Ebeers, industrial fuel engineer.

AMERICAN GAS FURNACE CO., New York. Exhibiting the company's method of carbonizing by gas; also heating machines and burners, covering a wide range of heating operations. Represented by Paul F. Reichhelm, A. W. Machlet, P. C. Osterman, G. L. Reichhelm.

AMERICAN METALLURGICAL CORPORATION, Philadelphia. Exhibiting blue prints of designs and suggestions for handling heat treatment problems. Exhibit in charge of Frank A. Hall, metallurgical engineer.

ARMSTRONG CORK CO., Pittsburgh. Exhibiting "Nonpareil" insulating brick for the insulation of boiler settings, furnaces, ovens, stills and other high temperature industrial equipment; also "Nonpareil" high pressure covering and blocks for the insulation of steam lines, breechings, etc.; also "Nonpareil" corkboard for the insulation of cold storage rooms, brine tanks, etc.; also "Nonpareil" cork covering for brine and ammonia lines and drinking water systems; and "Circle A" cork brick for floors. Representatives in charge, S. L. Barnes, E. C. Lloyd, of Pittsburgh, J. R. Livezey and Mr. Copestick, of Philadelphia.

ATLAS CRUCIBLE STEEL CO., Dunkirk, N. Y. Exhibiting samples of raw materials ferroalloys, tool steel, both in hot rolled and cold drawn condition; "L-XX" high speed drop forgings, different types of cutlery made from Atlas stainless steel, precision gages made from Atlas gage steel, together with various tools and dies. This company will also show moving pictures illustrating manufacturing process of tool steel. Represented by Gilbert Hamlin and W. D. Love, Philadelphia branch manager.

B

BAUSCH & LOMB OPTICAL CO., Rochester. Exhibiting various optical instruments for use in chemical and metallurgical laboratories, among these being microscopes, colorimeters and metallographic apparatus. Large metallographic equipment will be in operation. Represented by W. L. Patterson or E. H. Anthes.

BELL & GOSSETT CO., Chicago. Exhibiting "Caseite," case hardening compound; "Bathite," a substitute for lead, and "Cleancoat," which is used for lead covering instead of charcoal. This material is quite new for this use, as charcoal has been the medium for many years. "Cleancoat" is a product which is 95 per cent carbon, and it is claimed for it that it lasts several times longer than charcoal and it keeps the lead from oxidizing. Represented by W. C. Bell and E. J. Gossett.

W. R. BENNETT CO., Elmwood, Conn. Exhibiting small "Triad" furnace and lead bath furnace. Representatives in charge, W. R. Bennett and Walter Heath.

BETHLEHEM STEEL CO., Bethlehem, Pa. Exhibiting tool steel, special motor castings made with Mayari iron, a few pieces of rails treated by the Sandberg process, which is a new departure in rail manufacture; hardened steel rolls and Mayari steel dies. A special feature will be a board showing test results, fractures and micrographs of a bar of steel treated at ideal temperatures and improper temperatures. There will be a frame containing 120 micrographs, showing various types of microstructures obtained from different grades of steel receiving different heat treatment; also a large frame of transparencies showing the consecutive operations in the manufacture of steel beginning with pictures of coal and iron ore mines, limestone quarries, blast furnaces, open hearth process, forge department and mills on to the finished product. Represented by C. E. Chamberlin, sales agent; William Laurry, operating department; W. C. Cutler, and W. R. Shimer, sales metallurgist.

BRISTOL COMPANY, Waterbury, Conn. Exhibiting Bristol pyrometers, indicating and recording, also pyrometer temperature controllers. Represented by H. L. Griggs, general sales manager.

C. H. BROWN, Detroit. Exhibiting "Timeographs," a new instrument designed especially for heat treating operations of steel. A new automatic "Timeograph" will be demonstrated which works automatically on any predetermined time. Represented by Clair H. Brown and Clair P. Brustmaker.

BROWN INSTRUMENT CO., Philadelphia. Exhibiting high and low temperature measuring instruments, including indicating and recording pyrometers, recording thermometers, resistance thermometers, indicating and recording instruments for pressure, vacuum, speed, time and operation; latest developments in pyrometry that will be of interest to metallurgist and chemist will be demonstrated. Represened by J. D. Andrews, New York district; M. A. Leister, advertising manager; Geo. W. Goodman, R. B. McGafferty, C. D. Porterfield, O. W. Stowe, service engineer.

BUDA CO., Chicago. Exhibiting industrial trucks in operation.

BUREAU OF STANDARDS, Department of Commerce, Washington. Exhibiting photographs showing melting furnaces for production of ferrous and nonferrous alloys, including a quarter-ton Heroult type unit and a carbon plate resistance furnace; equipment for hot and cold working of metals and alloys, including our single stand 16-in. rolling mill, 150-ton forging press and heavy drawbench; furnaces available for thermal treatment, including gas and oil-fired and electric units; testing equipment, including metallographic laboratory, apparatus used for the standardization of thermocouples; equipment for magnetic surveys for the detection and location of internal flaws in steels, thermal analysis outfits, etc. There also will be exhibited a series of transparent micrographs illustrating the structures of metals and alloys, samples of worked metals, specially pure crucibles for production of pure metals at high temperatures, standard Hoke reference gages, standard chemical samples for laboratory control, pure metals for thermocouple standardization, etc. The publication of the bureau will also be exhibited. Represented by H. J. French, A. T. Derry, G. W. Johnson.

C

CELITE PRODUCTS CO., New York. Exhibiting "Sil-O-Cel" brick, powder and cement for heat insulation; also "Celite" high temperature cement for laying facing and patching firebrick insulation and "Celcote" for waterproofing "Sil-O-Cel" insulation.

CARBORUNDUM CO., Niagara Falls, N. Y. Exhibiting its line of refractory materials.

CASE HARDENING SERVICE CO., Cleveland. Exhibiting "Bohnite" case hardening compound and several samples of case hardening work done with it. Represented by W. C. Bell, president, and W. H. Bell, sales manager.

E. J. CODD CO., Baltimore. Exhibiting chain furnace doors.

CHICAGO FLEXIBLE SHAFT CO., Chicago. Exhibiting high speed steel hardening unit, consisting of two oven furnaces for preheating, and one oven furnace for high speed steel hardening, all equipped with Maxon pre-mix burners. This unit will be in actual operation. The furnaces to be shown are the regular No. 26 oven furnace and No. 1 oven furnace.

CRUCIBLE STEEL CO. OF AMERICA, Philadelphia. Exhibiting various cold drawn sections and shapes, alloy steels in the form of ball bearings and roller bearings, high speed drills, dental and surgical tools, also steels that are impervious to the effects of sulphuric, nitric and other acids; dies of all kinds for both hot and cold work, principally of an intricate and delicate nature that are

difficult to manufacture and harden successfully. Represented by J. W. Taylor and F. J. White, home office; F. H. Cooke, J. W. Barnett, R. B. Juni and A. L. Bradley.

D

DEARBORN CHEMICAL Co., Chicago. Exhibiting quenching oils, drawing oils, cutting oils, chemical cleaners, rust solvents and the company's "No-Ox-Id" rust preventive. The "No-Ox-Id" is a chemically compounded rust preventive, incorporated in a non-drying, non-hardening base of varying consistencies to meet different rust preventive problems under widely different conditions. Representatives in charge, Porter G. Jones, manager; J. E. Gassenmeyer, Philadelphia office; Charles A. Remsen, manager of Washington office; E. M. Converse, director department of specialties; A. D. McIlvaine, engineer department of specialties.

HENRY DISSTON & SONS, Philadelphia. Exhibiting Disston metal cutting saws and files and Disston crucible saw and tool steel. A feature of the steel display will be showing Disston steel in process of manufacture. This will be accomplished by showing a number of crucibles, with their contents, taken from the fire at different stages of the melting process. A number of steel ingots, fractured to show their structure, will also be on display. The metal cutting saw and file exhibit will consist of an attractive arrangement of finished saws and files; Disston sectional interlocking circular milling saws, hack saws, both power and hand; screw slotting saws; metal slitting saws, and Disston files of all kinds. Represented by Engle and Dorrington, Disston salesmen, and Mr. Merzbacher.

DRIVER-HARRIS Co., Harrison, N. J. Exhibiting cast nichrome containers and castings operating at carbonizing temperatures. Represented by A. Bensel, first vice-president; J. A. Delves, sales manager; J. B. Shelby, sales engineer; G. A. Rickert, advertising manager.

E

ELECTRIC FURNACE CONSTRUCTION Co., Philadelphia. Exhibiting parts and details of material used in the construction of the company's electric heat treating and annealing furnaces; also a section of wall showing arrangement of electric heating elements, fire brick and heat insulating brick, all for high temperature work; also a low temperature equipment, consisting of core oven, electric heating elements and oven truck will be shown. Represented by F. Hodson, H. H. Twose, F. W. Brooke, N. Neville, G. P. Mills.

CHARLES ENGELHARD, New York. Exhibiting Engelhard LeChatelier pyrometer, which is an automatic temperature regulator of recent development; a new base metal thermocouple and a new multiple-record pyrometer recording instrument, having frictionless moving system; also laboratory electric furnaces and "Impervite" refractories. Represented by E. S. Newcomb and C. W. Hubbard.

F

FAST FEED DRILL & TOOL CORPORATION, New York. Exhibiting drills and tools.

FEDERAL TOOL & ALLOY STEEL CORPORATION, New York. Exhibiting Swedish and domestic tool steels, Swedish and domestic mining drill steels, both solid and hollow sections; Swedish charcoal Lancashire bar iron; Swedish iron welding wire for both oxyacetylene and electric welding; high speed steel; drill rods; "Sisco" super machinery steel.

FERGUSON FURNACE Co., Toledo, Ohio. Exhibiting blue prints and literature covering company's furnace equipment. Represented by George Hoeffle, New York office; Gus Bluemel, engineer.

FORD CHAIN BLOCK Co., Philadelphia. Exhibiting "Tribloc" hoists and screw gear hoists in sizes commonly used in foundries and forge shops. Represented by J. V. Kelly and G. A. Pack, salesmen.

G

WILLIAM GANSCHOW Co., Chicago. Exhibiting automobile, truck, tractor and all kinds of heat-treated finished gears in general; also company's spur gear speed reducer. Represented by W. C. Tyler, eastern representative.

GENERAL ELECTRIC Co., Schenectady, N. Y. Reception booth.

GRISCOM-RUSSELL Co., New York. Exhibiting company's "Multiwhirl" cooler for the cooling of quenching oils used in the heat treatment of steel. This cooling of quenching oil permits continuous use of quenching bath and eliminates the possibility of excessive oil temperature and consequent fires. It is claimed for it that it insures uniform hardening in quantity production; also showing "G-R" strainer, which is designed for installation in the circulating oil line of quenching systems, its purpose being to prevent any scale or other heavy matter from entering the "Multiwhirl" cooler and clogging the oil path. Exhibit in charge of K. B. Millett, development engineer, and E. H. J. Dillon, manager of Philadelphia branch office.

H

GEORGE J. HAGAN Co., Pittsburgh. Exhibiting electric heating appliances as applied to the heat treatment of steel and electric heat treating furnace completely equipped with automatic temperature control. Represented by A. D. Dauch, F. W. Robertson and R. E. Talley, chief engineer.

HALCOMB STEEL Co., Syracuse, N. Y. Exhibiting tool and alloy steel ingots and billets, finished bars, both hot rolled and cold drawn, finished tools and parts of tool and alloy steel. Represented by H. H. McChesney, J. S. Marlowe, M. P. Spencer, J. F. Kirwan, A. Schroeder.

HEPPENSTALL FORGE & KNIFE Co., Pittsburgh. Exhibiting die blocks and dies broken due to improper heat treatment; shear knives, also heat treating products.

HOLZ & Co., INC., New York. Exhibiting apparatus of high quality for metallurgical and magnetic testing and research work, in operation.

HOOVER STEEL BALL Co., Ann Arbor, Mich. Exhibiting steel balls in all steps of their manufacture. Represented by H. G. Freeland, metallurgist.

HOSKINS MFG. Co., Detroit. Exhibiting electric industrial heat treating furnaces, indicating and recording pyrometers and "Chromel" heat resistant castings. A new electric furnace will be shown, which is characterized by ruggedness and the ease with which the user can renew its heating element. Another feature of interest will be the demonstration of how the user of Hoskins pyrometers can make his own thermocouples, by merely cutting off the required length of thermocouple wires from the two coils of wire, twisting them together at one end and welding the twist with an oxy-acetylene torch. Represented by Charles S. Kinnison, W. D. Little, F. L. Zimmerman and A. L. Malmstrom.

E. F. HOUGHTON & Co., Philadelphia. Exhibiting Houghton products, which have their application in heat treatment, hardening and other processes applicable to steel and iron, with special emphasis on quenching oils, carburizing compounds and rust preventives. Exhibit in charge of George W. Pressell, head of company's research staff, assisted by Felix Shay, general sales manager; J. A. Murphy, assistant general sales manager; Franklin T. Chapman, Philadelphia district sales manager; Martin T. Becker, Connecticut sales manager; Walter A. Buechner, Pittsburgh sales manager; James W. Kelley, Cleveland sales manager; E. W. Finkbiner, Newark sales manager; Thomas B. Maxfield, New York sales manager; Alton S. Hull, Walter Andrew, Paul C. Doerr, J. William Walsh, Edward A. Krueger, Edwin M. Giles, Gregory A. Oliver, F. A. B. Harris, Herbert Seward, John Weber, John Powers, F. V. Armato, M. B. Simmons, Walter L. Reading and H. E. Washburn.

J

B. M. JONES & Co., INC., New York. Exhibiting fractures of high speed steel and Taylors' Yorkshire iron.

L

LEEDS & NORTHRUP Co., Philadelphia. Exhibiting recording and indicating pyrometers, apparatus for transformation point determinations, automatic temperature controllers, equipment for precision checking of thermocouples; a special feature will be a number of electric furnaces for the Hump method of heat treating steel. This equipment will be in operation. Visitors are invited to bring in any small tool or punch and die, except high speed steel, for treatment by the Hump method. Represented by G. W. Tall, Jr., E. B. Estabrook, H. Brewer, O. Brewer, A. E. Tarr, A. M. Regging.

E. LEITZ, INC., New York. Exhibiting laboratory apparatus.

LUDLUM STEEL Co., Watervliet, N. Y. Exhibiting hot rolled annealed and hardened fractures of various kinds of tool steel.

M

MACLEOD Co., Cincinnati. Exhibiting photographs of sand blast installations. Represented by Walter Macleod and T. B. MacCabe.

MAHR MFG. Co., Minneapolis. Exhibiting oil and gas burning equipment, Mahr furnaces for heat treating, forging, etc., and the Mahr calorizor; models of furnaces on exhibition will be so arranged as to distinctly show the circulation of gases in a correctly designed heating chamber and also in one of incorrect design. Represented by R. B. Ecker, H. H. Keeler, H. A. Anderson.

MESTA MACHINE Co., Pittsburgh. Exhibiting large photographs, drawings and bulletins on pickling machines. Representative in charge, J. H. Snyder, mechanical engineer.

METAL & THERMIT CORPORATION, New York. Exhibiting various metals and alloys as are produced by alumino thermic process. A special feature at the exhibit will be "Tungtabs," a pure tungsten powder made in tablet form without binder. Representatives in charge, H. G. Spilsbury, mechanical engineer, and Arthur F. Braid.

MIDVALE STEEL & ORDNANCE Co., Philadelphia. Exhibiting tool steels, including various Midvale extra high speed steel. Represented by Ward A. Miller, H. E. Rowe and various sales representatives.

ALEXANDER MILBURN Co., Baltimore. Exhibiting acetylene generators for welding, oxyacetylene welding and cutting torches, and new types of acetylene regulating devices and kindred apparatus. The company's combination welding and cutting torch, which both cuts and welds with equal facility, will be demonstrated. A new regulator for the control and delivery of acetylene, oxygen, hydrogen and various other gases will be exhibited for the first time; other apparatus such as preheating burners, powerful portable acetylene lights will also be exhibited. Represented by E. P. Boyer, district representative for Philadelphia; J. A. Schleicher and C. E. Mitchell.

MODERN EQUIPMENT Co., Taunton, Mass. Exhibiting three types of Eaton electric furnaces for preheating and tempering. Represented by James A. Fairfield, secretary, and Frank True Durgin, electrical engineer.

O

S. OBERMAYER Co., Pittsburgh. Exhibiting "Hott-Patch" furnace cement for the lining of all furnaces such as cupolas, forging furnaces, heat treating furnaces and other places where high temperatures are reached. In connection with this demonstration a small electric furnace running a temperature of about 3100 deg. Fahr. will be used to demonstrate that "Hott-Patch" will withstand expansion and contraction. Another feature of exhibit will be the demonstration of "Esso" hydrogen absorber for use in picking baths. Represented by E. D. Frohman, J. L. Cummings, H. E. Beckman and J. M. Hildebrand.

TINIUS OLSEN TESTING MACHINE CO., Philadelphia. Exhibiting testing machine in operation.

ONONDAGA STEEL CO., INC., Syracuse, N. Y. Exhibiting high speed steel.

P

PENNSYLVANIA FORGE CO., Philadelphia. Reception booth. Represented by Charles C. Davis, president; A. P. Buffington, manager die block department; H. C. Platt, H. R. Scott, F. W. Dilks, D. V. Foster, sales manager.

PITTSBURGH INSTRUMENT & MACHINE CO., Pittsburgh. Exhibiting Brinnel testing machines, including a new type for laboratory and toolroom; Pittsburgh metal sheet tester and metallographic grinding machine.

HORACE T. POTTS & CO., Philadelphia. Exhibiting tools and other products made from various grades of tool steel of Potts' brand. Representatives in charge, Charles William Potts, Guy P. Bible, William Elmer Titus.

PYROMAGNETIC INSTRUMENT CO., Chicago. Exhibiting pyromagnetic instruments in operation. The instrument to be shown is something new in this particular line, and adapts itself to carbon steel and carbonized material.

Q

QUIGLEY FURNACE SPECIALTIES CO., INC., New York. Exhibiting heat treating equipment, including carbonizing and annealing boxes and cyanide, chloride and lead pots; "Hytemite," a high temperature refractory cement for bonding fire brick and granular refractory materials, and for repairing furnace linings of all descriptions; "Carbosand," a highly refractory fire sand for use in making furnace linings, special shapes, patches and repairs, etc.; "Insulbrix," a specially prepared cellular refractory brick for insulating furnace walls and structures for the conservation of heat, and Quigley powdered coal equipment for the preparation, distribution and burning of powdered coal in boilers and furnaces. Representatives: H. A. Kimber, vice-president; J. H. McFadden, secretary; F. W. Reisman, sales manager; H. H. Harris, manager, metals division; C. Gantzman.

R

REIHLE BROS. TESTING MACHINE CO., Philadelphia. Exhibiting testing machines in operation.

W. S. ROCKWELL CO., New York. No exhibit. Will distribute photographs, bulletins and other literature covering all the new and improved types of furnaces. Represented by J. A. Brown, M. L. Hollister, H. J. N. Voltmann.

RODMAN CHEMICAL CO., Verona, Pa. Exhibiting carbonizing materials with samples of carbonized steel products. Represented by Perry, Webb and Rodman.

ROESSLER & HASSLACHER CHEMICAL CO., New York. Exhibiting company's cyanide products used in heat treatment and surface hardening of steel, as well as in copper plating for localizing in connection with case hardening. Among these chemicals are cyanide soda 96-98 per cent, cyanide chloride mixture 73-76 per cent, and R. & H. case hardener and copper cyanide. Represented by Dr. F. Abegg, William M. Gager, M. E. Stewart and C. H. Proctor.

S

SAFETY EQUIPMENT SERVICE CO., Cleveland. Exhibiting goggles, hospital equipment, sterilizers, first aid equipment, sanitary drinking fountains, playground equipment, safety clothing, individual towels and drinking cups and various other safety equipment. Represented by B. W. Nutt, B. Frank, H. L. Wood and T. P. Scully.

SCIENTIFIC MATERIALS CO., Pittsburgh. Exhibiting Brinnel hardness testing machines; "Scimatco" optical bench, "Scimatco" optical pyrometer and other equipment of metallurgists.

SIMONDS STEEL MILLS, Lockport, N. Y. Exhibiting crucible and electric furnace steels and steel products.

SMITH GAS ENGINEERING CO., Dayton, Ohio. Exhibiting the company's Type "F" tar extractor. Represented by George H. Trout, William P. Duff, J. P. Staples and Earl E. Adams.

SPENCER TURBINE CO., Hartford, Conn. Machines in operation supplying air for various furnace manufacturers. The company's turbo compressor will be shown in the booth. Representative in charge, S. E. Phillips, secretary.

SPRING PERCH CO., Stratford, Conn. Exhibiting Fuller automatic heat regulator, adapted for fuel-oil or gas furnaces. A special feature is a fuel-oil controller, the inventor of which, Mr. Fuller, will be on hand to explain its advantages.

STANDARD FUEL ENGINEERING CO., Detroit. Exhibiting several types of standard furnaces for the tool room, consisting of one high speed steel furnace, one carbon steel furnace, one lead and cyanide hardening furnace and one oil tempering furnace. Represented by George H. Willett, president, and his assistants: F. A. Calhoun, Eastern representative, and his associate, Mr. Baad.

STEEL CITY TESTING LABORATORY, Pittsburgh. Exhibiting Brinnel testing machines in operation.

STEEL TREATING EQUIPMENT CO., Detroit. Exhibiting examples of carburizing work done without compounds which are known as "Steco', No. 4 and No. 6, and "Plastico" compound. "Steco" No. 4 and No. 6 is a dry compound for pack hardening, while the "Plastico" is a relatively new compound in plastic form used as a case hardening agent. E. H. Marot, sales manager, in charge of exhibit.

STRONG, CARLISLE & HAMMOND CO., Cleveland. Exhibiting one No. 7 furnace, arranged for artificial gas fuel, and one No. 8 furnace, arranged for oil fuel. These two furnaces are typical of the company's line of annealing and case hardening furnaces, each being equipped with a raised side tile to prevent the work from overhanging the combustion chamber and also equipped with a hand chain device for operating the door from the side of the furnace, thus eliminating the necessity of an operator having to stand in the direct heat of the furnace when it is necessary to open the doors. In addition to the furnace room equipment, part of which will be shown in actual operation, the company will exhibit a full line of pyrometer equipment and "Tapalogs," as well as the S. C. & H. oil system. The company will also show No. 21 furnace, which is arranged for oil fuel, and No. 55-A furnace, which is arranged for artificial gas fuel, and No. 498 furnace, also arranged for artificial gas fuel. Represented by R. Wooler, Philadelphia representative, and S. Tache, Jr., furnace engineer.

SUPPLEE-BIDDLE HARDWARE CO., Philadelphia. Exhibiting heat resisting metals for which the trade mark "Pyroloy" has been adopted, combined of the Greek word "Pyros," meaning fire, and the word alloys. Represented by C. M. Biddle, Jr., vice-president; George W. Franzheim, consulting engineer; P. J. Myall, of Munk & Myall, Monadnock Block, Chicago; C. E. Wister, Cleveland; R. H. Cunningham, manager of Hiram Walker & Sons Metal Products Co., Walkerville, Ont.

SURFACE COMBUSTION CO., New York. Exhibiting a 25-oven furnace, lead hardening furnace, forge furnace and rivet heating furnace. Represented by William Hepburn and Morris Goodman.

T

TACONY STEEL CO., Philadelphia. Exhibiting Tacony die blocks and Tacony alloy piston rods. Represented by Paul J. Driscoll, general sales manager; H. A. Baxter, metallurgical engineer, and members of the sales force.

TATE-JONES & CO., INC., Pittsburgh. Exhibiting blue prints, catalogs, circulars, etc., describing complete line of oil burners, pumping systems and furnaces; also special descriptions and blue prints of their rotating hearth carbonizing furnace which has recently been developed for continuous carbonizing work. Represented by M. K. Epstein, Philadelphia representative; W. M. Smith, New York representative; W. L. Munk, Chicago; James H. Knapp, vice-president.

N. & G. TAYLOR CO., Philadelphia. Exhibiting company's make of double selected forging steel, made especially for the drop forging trade. This is a product of small open hearth furnaces and a special rolling practice developed at company's works, Cumberland, Md. Represented by H. N. Taylor, president; R. C. Drinker, consulting metallurgist; Isaac Berman, works metallurgist; Harry Muschenheim.

ARTHUR H. THOMAS CO., Philadelphia. Exhibiting Kelley electrometric titration outfit for the rapid and accurate determination of chromium, vanadium and manganese; also Stetser and Norton combustion train for the determination of carbon in steel by the direct combustion method using "Ascarite," the company's trade marked sodium hydrate asbestos absorbent; also grinding and polishing machines for grinding metallographic specimens, analytical balances of Troemeer and Newton manufacture and other specialties used in steel works metallurgical and chemical laboratories. Represented by R. M. Miller, sales manager; H. C. Roak, assistant sales manager, and C. C. Roberts, technical representative.

THWING INSTRUMENT CO., Philadelphia. Exhibiting recording instruments.

U

U. S. HIGH SPEED STEEL & TOOL CORPORATION, New York. Exhibiting high speed tools, manufactured under the company's own processes. Represented by J. L. Thorne, R. Boyd Burleigh, manager of Philadelphia district, and Ralph Dudley, sales manager.

V

VANADIUM ALLOYS STEEL CO., Pittsburgh. Reception booth. Represented by John Theis, Philadelphia manager; W. F. Buffington, Fred C. Comas, D. J. Slowe, H. F. Bardwell, New York manager; F. P. O'Connor, W. M. Burdick, D. A. Black, Boston manager; C. E. Karle, W. R. Mau, Chicago manager; A. G. Henry, R. L. Daull, Cleveland manager; A. F. MacFarland, metallurgist and Detroit manager.

D. VAN NOSTRAND CO., New York. Exhibiting books relating to the iron industry and industrial chemistry, featuring such books as Rogers' "Manual of Industrial Chemistry," Charnock's "Mechanical Technology," Richards' "Forging of Iron and Steel" and Cauch's "Dictionary of Chemical Terms." Represented by A. G. Heany and E. M. Crane.

W

EDGAR T. WARD'S SONS CO., Boston. Exhibiting tool steels and steel specialties.

WAYNE OIL TANK & PUMP CO., Fort Wayne, Ind. Exhibiting two furnaces, one of the oven type and one of the forge type. One of these furnaces will be fitted with a Wayne oil burner and the other with a Wayne combination gas and oil burner. Represented by S. D. Richard, manager engineering sales; E. B. Lipsett, engineering salesman, and A. P. Hitzeman, engineering salesman.

WHEELOCK, LOVEJOY & CO., INC., Cambridge, Mass. Exhibiting the company's various "Hy-Ten" alloy steels consisting principally of automobile and machine tool parts. Represented by the following: E. P. Gaffney, Chicago district manager; W. H. Waddington, New York district manager; H. M. Foster, sales engineer; H. T. Stewart, sales engineer; A. E. Hunt, assistant to vice-president; T. L. Kirkpatrick, manager of "Hy-Ten" department.

WIDNEY TEST LABORATORIES, Chicago. Exhibiting Widney modulimeter, testing apparatus to determine important physical properties of steel and other metals. Represented by S. W. Widney, president and general manager, and R. G. Guthrie, director of tests.

WILSON-MAEULEN CO., New York. Exhibiting indicating pyrometers and the company's multiple record pyrometer recorder, the "Tapalog," also the Rockwell hardness tester. Represented by several principals of the sales and engineering staffs.

Heat Treating Automobile Drive Shafts

New Plant of the Timken-Detroit Axle Co.—Furnaces Have Flues in the Doors —Waste Gases Used for Pre-Heating

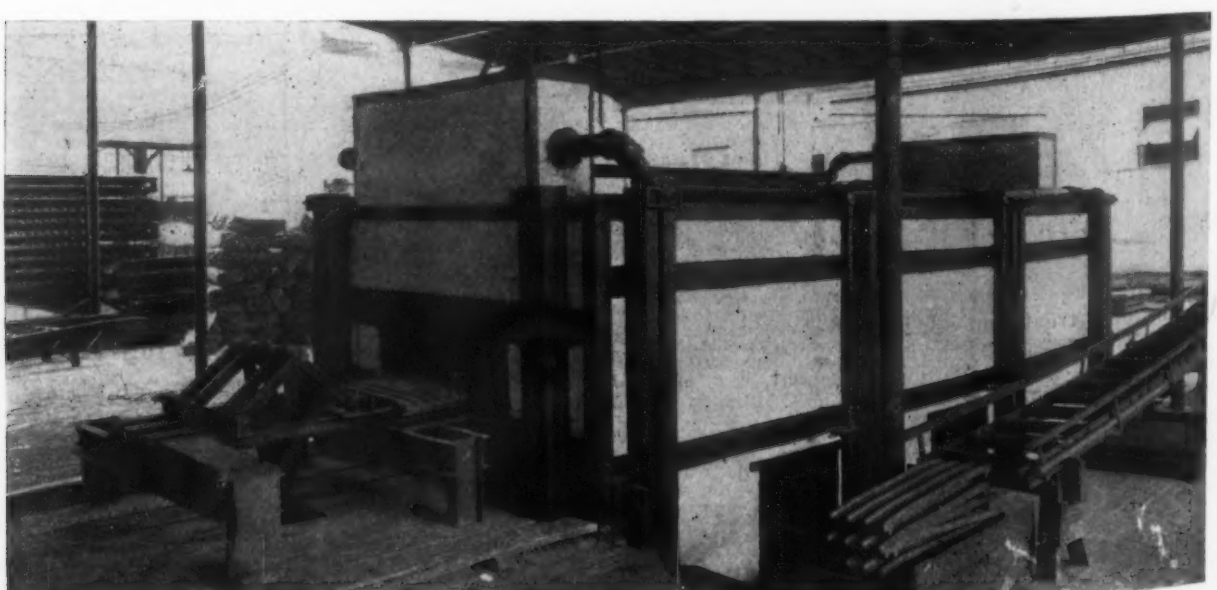
THE Timken-Detroit Axle Co., Detroit, recently placed in operation a new heat-treating plant which has several interesting features in equipment and arrangement. Among these is a continuous furnace of the pusher type for annealing automobile drive shafts and other heat-treated parts.

The plant is equipped with 28 oil-fired heat-treating and carbonizing furnaces, these being divided into three batteries. One type used for carbonizing consists of single chamber furnaces 8 ft. wide 8 ft. deep with two doors. The second type is a double chamber furnace with chambers 5 ft. wide and 5 ft. deep. Both these and the large furnaces have their hearths on a level with the floor. Furnaces in the third battery are similar to those in the second in size and design, but their hearths are 2 ft. above the floor. These furnaces are used for lighter work.

A distinctive feature of the furnaces is that they have flues in the doors at the front to provide sufficient draft to bring the hot gases up to the doors and prevent cold spots in front of the doors. These flues, three in number, in each door are 4½ in. outside diameter in the large furnaces and 3½ in. outside diameter in the smaller and extend up a distance of about 30 in. from about 2 in. above the furnace floor. In some of the furnaces the flues are built in the doors and others have a flue pipe in front of the door connecting with an elbow that extends through a hole near the bottom of the door. The flues can be equipped with dampers if desired.

The Heat-Treating Plant, Showing the Arrangement of the Furnaces. The oil lines and valve connections are located in a pit that extends along the outer wall

Waste gas passes to the back of the furnace and around a coil through which the incoming air is delivered by the blower. This coil provides a preheating chamber for the blast. Back of the furnaces, which are arranged in a straight row at one side of the building in line with the interior building columns, is a concrete trench 4½ ft.



The Pusher Type Furnace in the Plant of the Timken-Detroit Axle Co., for Annealing Auto Driving Shafts. The work is pushed through the furnace by the arms shown in front of the door. Plates on which the work is carried through the furnace chamber are returned on the gravity conveyor, several of these plates appearing in the picture at the discharge end of the conveyor

The Heat-Treating Furnaces Have Flues in Their Doors to Provide a Draft and Prevent Cold Spots in Front of the Doors. Quenching tanks are located on the floor level in front of the furnaces, their covers forming an incline on which work slides into the quenching tank

deep in which is located the oil lines and valve connections to the furnace.

The quenching tanks are located with their tops on the floor level directly in front of the furnaces. These have steel plate covers. In the case of the furnaces with hearths raised above the floor the covers are drawn over and rest at an angle against the front of the furnace, forming an incline on which work drawn from the chambers slides into a quenching tank. The furnaces were built under the supervision of T. J. Goodnow of the T. J. Goodnow Co., who holds the patent rights to the flue in the door.

The plant is also equipped with several small Bellevue furnaces for hardening pinions, bushings, etc.

The annealing furnace is 22 ft. long, and 9 ft. wide, outside dimensions. It is charged at one end and annealed parts pass out at the opposite end. It is divided into three chambers, the first for preheating, the second for annealing and the third a cooling chamber. The temperature in each chamber is separately controlled. There is a thermoscope in each section connected to a pyrometer.

The pusher mechanism is located in a pit in front of the furnace. The drive is from a motor, through a gear and eccentric to slowly moving arms that extend in front of the furnace. The work is placed on a cast iron plate 9 in. wide and 32 in. long in front of the furnace and when the arms are spread out, bringing them into a vertical position, this plate is pushed forward several inches. When the pusher arms are drawn back by the doubling movement of the arms, space is left for the placing of another plate and piece of work in front of the furnace. When one plate is placed in front of the pusher and pushed forward another is being pushed out at the discharge end. The furnace has a chain door at each end. The parts as they come from the furnace are loaded on wheelbarrows or tractors. The plates on which they go through the furnace are placed on a gravity carrier on which they run back to the front of the furnace. The work moves from the furnace in two and a half hours and the furnace has a daily capacity of 45 to 48 tons.

Heat Treating Problem Solved By Applied Mechanics

Suggestion to Prevent Injurious Defects Arising from Bending or Straightening Material During or After Heat Treatment

—E. P. STENGER*—

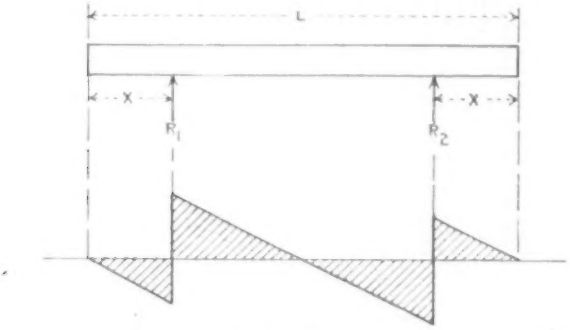
ONE of the operations often found necessary in the heat treatment of long and slender objects, such as shafts, axles, etc., is that of straightening. Bending during heat treatment, in some instances, cannot be entirely eliminated but, if care is taken to see that the work is properly supported during heating and skilfully handled during the quenching operation, then bending will be reduced to a minimum with a corresponding saving of time and labor required for straightening. Aside from the strictly economical aspect it will be granted that straightening after heat treatment is objectionable since it must be accompanied by plastic deformation and thus it is instrumental in producing internal stresses.

Sometimes vertical heat-treating furnaces are resorted to in order to prevent bending. In such furnaces the objects to be treated are suspended in a vertical position both during heating and quenching. Such furnaces accomplish the object, but are too special for the class of work met with in many plants. When such is the case, the heat treatment is carried out in the conventional type of furnace wherein the work is heated in a horizontal position. It is then important that the work be properly supported. This is almost invariably left for the practical shop man to guess at, whereas the technical man with a knowledge

*Metallurgical engineer, Thompson & Black, engineers and accountants, New York, Detroit and Kansas City.

of mechanics is fitted to give an exact solution.

The problem presented itself in the heat-treatment of locomotive-axles, ship propeller-shafts, etc., and when the principles of mechanics were applied in determining where the supports should be placed a large reduction in bending was noted. During the heating operation the axles were



Shear Diagram

placed on two supports, one near either end, and were quenched from the car of the furnace by means of a crane and two loop chains. The mathematical solution in this case was as follows:

W = Total weight (uniformally distributed).
L = Length in feet.
X = Distance of support from end.

$$R_1 \text{ and } R_2 = \frac{W}{2}$$

Since the moments that produce bending are a maximum at the point where the shear passes through zero, it is seen from the diagram that the bending moments are a maximum at the center and at the points of support, R_1 and R_2. Therefore, to obtain the least bending it is essential to make the bending moment at the supports equal to minus the bending moments at the center:

$$\text{Bending moment at center} = \frac{WL}{8} - \frac{W}{2}\left(\frac{L}{2} - X\right)$$

$$= \frac{WX}{2} - \frac{WL}{8}$$

$$\text{Bending moment at support } R^2 = \frac{WX^2}{2L}$$

$$\text{Then } \frac{WX^2}{2L} + \frac{WX}{2} - \frac{WL}{8} = 0$$

$$\frac{X^2}{L} + \frac{X - L}{4} = 0$$

$$X = \frac{-1 \vee \overline{1+1}}{\frac{2}{L}}$$

$$X = \frac{.414\,L}{2} = .207\,L$$

or roughly $X = 1/5$ length.

From the foregoing it is seen that for minimum bending (hence minimum straightening costs) of uniform section, cylindrical, rectangular or otherwise, which are supported at two points during either heating or quenching, it is necessary for the points of support to be located at a distance of 0.207 x length from either end. Non-uniform sections call for special treatment, but their solution can be arrived at by following the same principles as in the preceding.

Training Students in Industrial Management

A pioneer experiment in the method of teaching industrial management to engineering students was outlined in a paper by Bruce W. Benedict, manager of shop laboratories, University of Illinois, Urbana, Ill., presented at the Indianapolis mid-west section's meeting of the American Society of Mechanical Engineers, Oct. 24, 1919, and reprinted in the journal of the society, 29 West Twenty-ninth Street, New York. The author points out that notwithstanding appeals for men with particular training, the technical schools cannot attempt the preparation of engineers for special tasks, also, lacking a real engineering setting and having no direct need for consideration of those economic and human factors which enter so largely into the practice of engineering, the technical school has to a large degree ignored them in its treatment of engineering subjects. To provide for the expressed need, however, the University of Illinois has organized its school shops to give them a commercial basis; the details of the system employed and the manner of conducting the work were described by the author.

The plan is based upon the engineer's being primarily a manager of human enterprises rather than a technician making plans for others to execute. The shop laboratories are organized as though a gas engine manufactory. The plant consists of five departments: pattern, foundry, forge, machine and assembly. Each department, except the latter, is in charge of a superintendent who is responsible for both operation and instruction. An assistant superintendent, mechanics and toolroom attendants complete the departmental organization.

The operating organization is supplied from the ranks of students specializing in mechanical, electrical and railroad engineering during the sophomore and junior years. This group of embryo engineers is trained to operate the plant and produce gas engines efficiently and economically. Production is sought not for the usual commercial reasons, but as a laboratory exercise for training men in the principles of management and in the mechanical processes of production.

Despite the scarcity of American tin plate and consequently of cans, Consul Felix S. S. Johnson, Kingston, Ontario, reports that not a great deal of apprehension is entertained by the Canadian canned goods industry about a famine in containers during the current season, although no opportunity to get supplies has been neglected. Producers of cans are in close touch with American manufacturers of tin plate, and they have been able to get fairly satisfactory deliveries, notwithstanding the traffic conditions of the past few months. Shipment of cans has been made over the less congested routes. One alternative was to have deliveries made by car ferry from Cleveland to a Canadian point on Lake Erie.

More than 1700 employees of the General Electric Co., Schenectady, N. Y., have completed 25 years or more of service with that organization. Their combined term of service totals 47,709 years and their total age is 91,550 years. These men have formed a Quarter Century Club. Membership in the organization is divided as follows: Schenectady Works and offices, 1003; district offices, 137; Pittsfield, 37; Erie, 12; Ft. Wayne, 68; Harrison, 44; Lynn, 370; Sprague and Bloomfield, 31.

Since the early part of July the Willys-Overland Co., Toledo, Ohio, has reduced its working force by about 2000 men, with curtailment in production from 600 to about 450 completed cars a day. It is expected to maintain the present operating schedule for some time to come.

Tests on Tempering Certain Grades of Steel

Effect of Temperatures and Time in Hardening and Drawing Operations in the Final Hardness of Carbon Tool, Ball Bearing and High Speed Steels

BY CARL T. HEWITT*

THE extent to which various degrees of temperature used in tempering or drawing hardened steels affect the hardness of these steels and also the effect of the time element on this phase of heat treatment have always been subjects of more or less dispute among heat treaters and tool makers. Therefore, it is with the hope of making this clearer to those interested in such work that this article is written.

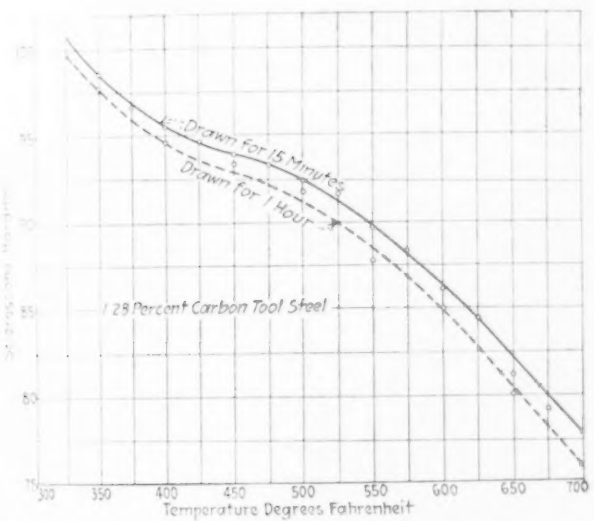


Fig. 1.—Double Curve of Scleroscope Hardness Figures on High Carbon (1.28 Per Cent) Tool Steel. Upper curve represents the average hardness of steel blocks when drawn at temperatures ranging from 350 to 700 deg. Fahr. for a period of 15 min. The lower curve represents the average hardness of steel blocks when drawn at the same temperatures for one hour.

It is very seldom that a hardened piece of steel can be successfully used after coming directly from the quenching bath due to its being too brittle to withstand its functioning shocks and, therefore, some of its hardness must be sacrificed to secure in it the toughness to stand up for the particular use for which it is intended. This condition is attained by re-heating the hardened piece anywhere from a temperature of boiling water, or 212 deg. Fahr. up to as high as 1150 deg. Fahr., which is often done with high speed steel. This latter, while being a tempering operation, imparts to high speed steel an increased hardness rather than diminished hardness, but more will be said regarding this particular steel later.

Three Types of Steels Used

Experiments were carried out on three kinds of steel, and although they do not cover by any means the large field of steels of to-day, they are representative of three types in very common use. These steels were a straight high carbon tool steel; a high carbon, high chrome ball-bearing steel, and a high tungsten high speed steel.

High Carbon Tool Steel.—The results obtained with the high carbon tool steel will be taken up first. Fig. 1 shows a double curve which was obtained by using scleroscope hardness figures as ordinates and drawing temperatures as abscissa, and each point represents the average of 50 readings. The upper curve represents the average hardness of steel blocks when drawn at temperatures varying from 350 up to 700 deg. Fahr. for a period of fifteen minutes. The lower curve represents the average hardness of steel blocks when drawn at the same temperatures but for a period of one hour. Both curves are very regular in form and are very nearly parallel over their whole length. At 350 deg. Fahr. the difference is one point on the scleroscope, while at 700 deg. Fahr. the difference increases to two points. This is logical, as the higher heats would tend to act more rapidly to soften the steel than the lower ones. The test pieces were made by milling off opposite sides of ½ in. round stock to a thickness of about 5/16 in., then rough grinding to make the sides parallel. The hardening was very carefully done in a gas fired semi-muffle type furnace in which the temperature was controlled by a rare-metal couple. All pieces were hardened in water from the same hardening temperature which was 1420 deg. Fahr.

After the pieces were hardened they were drawn in an oil or niter bath, depending on the temperature required, to the different temperatures shown on the curve and for the times indicated. After drawing all pieces were carefully ground again to remove all scale and possible decarbonization and also to correct any tendency to warp and thus destroy the accuracy of the scleroscope readings. The scleroscope tests were made with an indicating instrument.

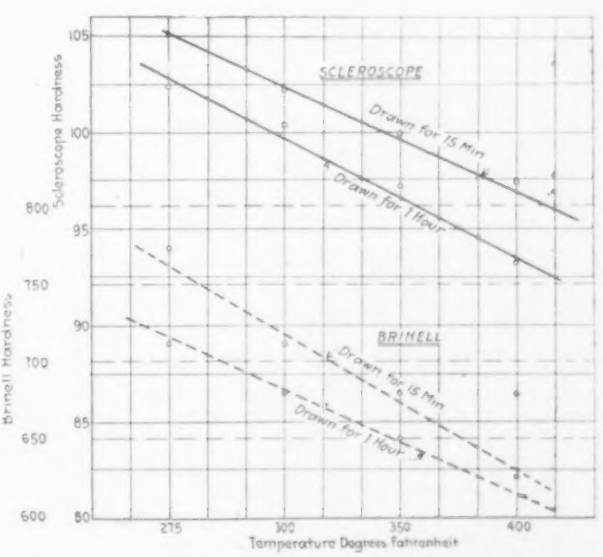


Fig. 2.—Results Obtained with a High Carbon Chromium Ball Bearing Steel by Drawing at Different Temperatures, as Indicated, by Both 15 Min. and One Hour. Upper pair of curves represent scleroscope hardness and the lower pair Brinell hardness. Composition of the steel: Carbon, 1.00 per cent; chromium, 1.40 per cent.

The conclusions which can be drawn from this test are that with a constant temperature, an effect equal to an increased drawing temperature can be produced by increasing the length of time

*Metallurgist, Fafnir Bearing Co., New Britain, Conn.

in the drawing bath, but that this increased softening, due to the longer time in the hardening bath, is not of sufficient degree to cause any but a desirable result, the increased toughening which results more than counteracting the loss in hardness. In fact the double drawing of tools which must stand up under especially severe working conditions, has been advocated by a number of authorities, and undoubtedly possesses merit.

Chromium Ball Bearing Steels.—The curves for

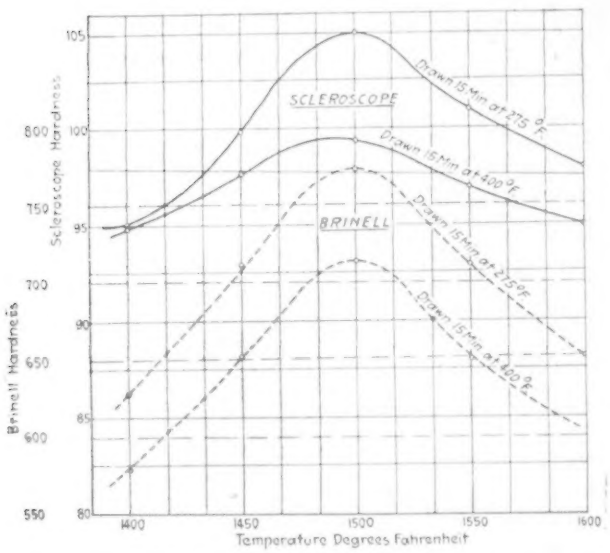


Fig. 3.—Two Pairs of Curves, One for Scleroscope Hardness and One for Brinell Hardness. The steel used was a high carbon high chromium ball bearing steel. Composition of the steel same as in Fig. 2.

tool steel would indicate that there is a critical drawing point around 450 deg. Fahr., but otherwise there is a uniform decrease in hardness as the drawing temperature is increased. Fig. 2 shows the results obtained with a high carbon, high chromium ball bearing steel by drawing at different temperatures as indicated for both 15 min. and one hour. The upper pair of curves represents scleroscope hardness, and the lower pair represents Brinell hardness. The results are similar to those obtained with tool steel, but the differences between the short and long drawings are more decided. This fact is borne out in practice, as it has been found that this steel is much more sensitive to heat changes than carbon tool steels, and will not stand as much of a draw for an equal degree of hardness.

Another interesting point regarding ball bearing steel is that oftentimes the scleroscope does not indicate the true hardness. Two hardened pieces, one of which cannot be touched by an especially hard file, and the other quite easily filed, will show the reverse result on the scleroscope. Ball bearing steel in its hardened condition is very dense in structure, and retains this extreme refinement through its different transition forms from austenite down to pearlite. There is a decrease in hardness during these several transitions which may be detected with a file, but due to the fine grain structure and condition of the steel, the scleroscope does not register these changes.

Fig. 3 shows two pairs of curves, one for scleroscope and one for Brinell hardness, which are plotted with these hardness numbers as ordinates and hardening temperatures as abscissa.

The steel used was high carbon, high chromium ball bearing steel and the test pieces were quenched in oil from the indicated temperatures. One curve of each pair is for samples drawn at 275 deg. Fahr. for 15 min., and the other is for samples drawn at 400 deg. Fahr. for 15 min. The curves are fairly consistent, and show that a maximum hardness was obtained with pieces hardened at 1500 deg. Fahr., and that there is a considerable softening of the steel by increasing the drawing temperature from 275 deg. to 400 deg. Fahr.

High Speed Steel.—Fig. 4 shows three curves obtained on an 18 per cent tungsten high speed steel. The curves were plotted with scleroscope hardnesses as ordinates and drawing temperatures in degrees Fahrenheit as abscissa. The results of curve A were obtained on test pieces heated to 2300 deg. Fahr. without preheating and quenched from this temperature in lead which was at 1350 deg. Fahr. This curve is very regular in form and shows a consistent increase in scleroscopic hardness up to the highest drawing temperature of 1150 deg. Fahr.

The test pieces from which curve B was obtained were preheated to 1500 deg. Fahr., quickly brought up to 2300 deg. Fahr., from which tem-

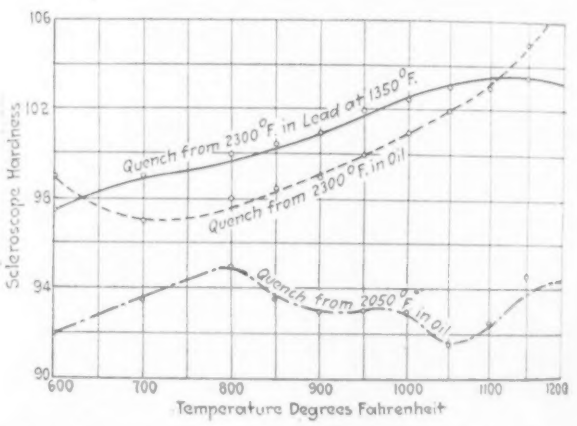


Fig. 4.—Three Curves Obtained on An 18 Per Cent Tungsten High Speed Steel.

perature they were quenched in oil. This is the standard heat-treatment recommended by most steel companies for their best grades of high speed steel where tools can be ground before being used. The curve shows a good hardness when drawn at 600 deg. Fahr., then a falling off followed by an increase up to the final draw of 1150 deg. Fahr., at which temperature a maximum is obtained. This curve corresponds with similar curves obtained by other persons experimenting on this same kind of steel, and clearly shows the virtue of a high draw back when the steel has been quenched from a heat of at least 2300 deg. Fahr. This same steel quenched from a temperature of 2050 deg. Fahr. will not stand as high a draw back as is clearly shown by curve C, which represents the draw back of a high speed steel quenched from this temperature. Furthermore, this curve is by no means as consistent as A or B, which goes to show the value of a high quenching temperature. There are a great many cases, however, where the high heat cannot be used, due to the necessity of preserving the original contour of the tool or the impossibility of grinding, and in such instances the last mentioned treatment followed by a draw back of 350 to 400 deg. Fahr. has been used with excellent results.

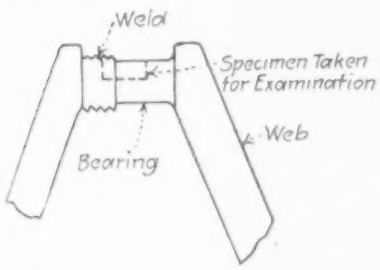
The amount that a tool can be drawn, or softened, and still do the work intended, whether carbon or alloy steel, must be established accurately and the drawing should be carried as far as practicable. Many expensive tools would be saved from the scrap pile if the hardening operation were followed by a drawback which suited the conditions under which the tools were to operate.

Welding Heat-Treated Chrome Alloy Steel

How Controlling the Welding Heat Insured a Minimum of Injury to Original Structure—Special Welding Machine Employed — Saving Defective Forgings

BY J. CHURCHWARD*

IT has been stated that chrome alloy steels can not be welded or that correct fusion can not be accomplished between the metallic electrode and the chrome alloy steel. While it is not yet possible to equal the physical characteristics of the chrome alloy in the weld, it is possible to save a considerable portion of defective forgings by welding, provided only a building-up operation



Location of Specimen from a Welded Chrome Alloy Steel Crankshaft

is undertaken. In case of repair work the whole bearing of a crankshaft can be built up and turned down which, though technically not as good as a new shaft, practically is so, and will give a surprising amount of service at a cost of about one-twentieth of its replacement.

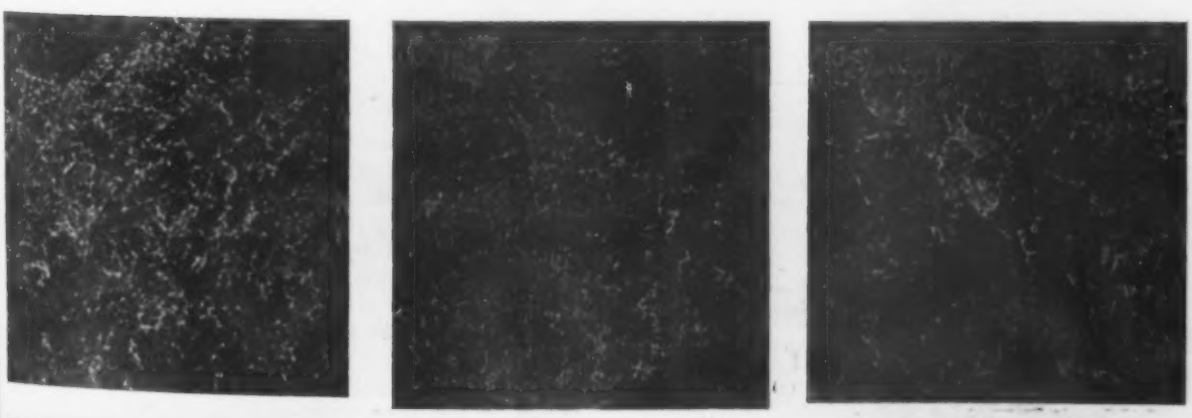
Heretofore, the main objection to the welding of heat-treated parts has been that the welding practically destroyed the effect of the heat treatment. The only method of determining how much the heat treatment has been affected is by microscopic examination of the weld.

Five photomicrographs of a chrome-vanadium crankshaft of the following composition: Carbon, 0.28; manganese, 0.68; sulphur, 0.03; phosphorus, 0.015; silicon, 0.12; chromium, 0.95, and vanadium, 0.17, are reproduced. A straight carbon steel electrode, 0.148 in. in diameter and containing carbon, 0.40; manganese, 1.00; phosphorus, 0.02; sulphur, 0.03 and silicon, 0.10 per cent was used. A welding machine was used capable of controlling the heat in the weld at all times with an open circuit voltage of 35 volts and an amperage of 125 amperes. This machine gives a maximum variation of 5 per cent of the amperage.

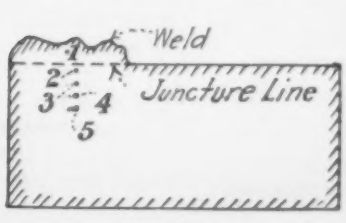
Photomicrograph No. 1 shows the additional 2 mm (0.08 in.) from the juncture line. This reveals ferrite and sorbite, the added material having absorbed the alloys of the parent metal. Photomicrograph No. 2 shows the juncture of the weld, the weld revealing more free ferrite than the parent metal. Photomicrograph No. 3 shows the parent metal 2 mm (0.08 in.) from juncture line of weld. The grain size is slightly affected, but there is no evidence of a high burning heat. Photomicrograph No. 4 shows the parent metal 5 mm (0.20 in.) from juncture line. Except for a very small increase in grain size and a larger precipitation of ferrite this is the same structure as the original metal. Photomicrograph No. 5 shows the parent metal 10 mm (0.40 in.) away from juncture line of weld. This shows the sorbitic structure

(*Continued on page* 642)

*Metallurgist, Wilson, Welder & Metals Co., Brooklyn, N. Y.



The Five Photomicrographs (Nos. 1, 2 and 3 Upper Row and Nos. 4 and 5 Lower Row) Represent the Structure at the Five Points in the Section of Steel Cut From the Shaft and Shown in the Drawing. They are discussed in the text



AUTOMATIC CONVEYOR FURNACE

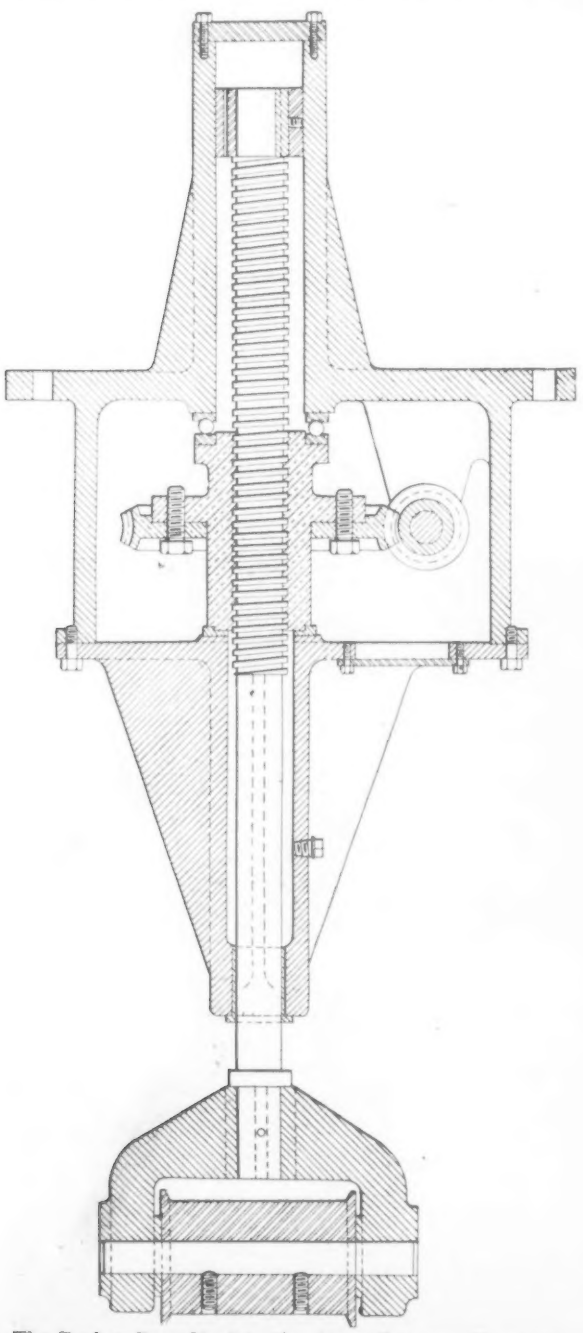
New Type in Which Hearth Does Not Leave the Furnace, Minimizing Heat Loss

A NEW type of conveying furnace for heat treating steel has been developed by the American Metallurgical Corporation, Philadelphia. It has been given the name Amco conveying furnace. The conveying hearth never leaves the furnace. The material is moved along in stages under automatic control and the heat stored up in the conveyor is not lost.

The principle on which this furnace operates is revealed by the illustration. The work is raised from the hearth by a suitable number of beams consisting of refractory blocks from 6 in. to 24 in. in width, depending upon the work to be handled, and from 18 in. to 36 in. deep. These blocks extend from end to end of the furnace in slots in the furnace floor and are raised and lowered by jacks as shown. The extent of travel above and below the hearth floor in a vertical direction is adjustable for the conditions prevailing in operation. The horizontal movement of these conveying beams is by a crank and link motion operated by a separate source of power and is therefore entirely independent of the raising and lowering mechanism. In operation a cycle would be as follows:

The jacks raise the beam above the floor level thus lifting the work clear above the hearth. A limit switch cuts off the motor operating the lifting mechanism and cuts on a motor operating the racking mechanism a few seconds after the vertical motion is stopped. The racking mechanism moves the beams forward a predetermined distance when the motor actuating it is stopped and, after a few seconds' interval, the first motor is again cut on in a reverse direction. This lowers the work back to the hearth but now advanced some distance forward in the furnace. The lowering of the beam continues until it is sufficiently far below the floor line to give proper clearance when the limit switch again works and the racking mechanism moves the conveyor beam back to its original position. This completes the cycle and by continued repetition of this process, controlled by the proper clock mechanism timing devices, the desired results can be obtained. Independent beams can be used which would permit setting one beam higher than the other to take offset pieces. Also the length of each step can be varied readily by changing the eccentricity of the link operating the racking movement.

The conveying mechanism is offered particularly in heating such work as crank and cam shafts, axles, frames, bars, tubes and many other similar products. Systems of two or three furnaces can be designed to handle material continuously through annealing, quenching and drawing operations. This mechanism can also handle small parts on pans or in boxes of lighter construction than is necessary for the pusher type, thus saving the mass of material to be heated with the work and securing a higher efficiency of operation for the furnace.



The Pusher Ram Used in the Amco Conveyor Furnace

(*Continued from page* 641)

common in steel of this composition. There is absolutely no effect from the welding heat.

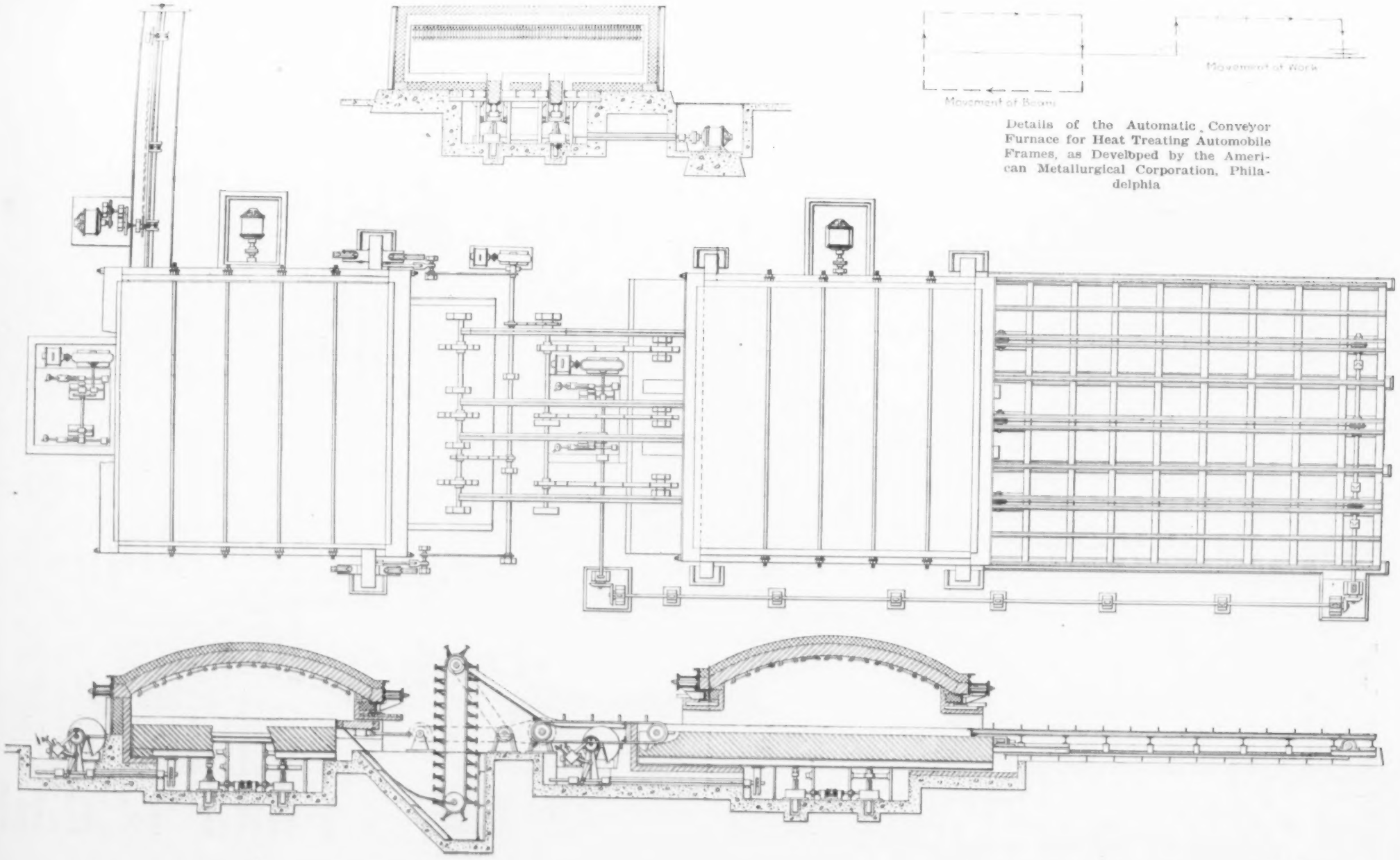
The heat treatment which this shaft underwent was as follows:

Heated at 1650 deg. Fahr. 1 hr., then air cooled.
Heated at 1540 deg. Fahr. 1¼ hrs., then quenched in solution.
Heated at 1020 deg. Fahr. 2½ hrs., then annealed.

A bearing surface was welded up to ½ in. entirely around it and a section was cut from it. The specimen was polished and etched deeply with a 4 per cent solution of nitric acid in water, then repolished on the rouge. The distances were measured. A mechanical stage with a graduated scale reading in millimeters was used. After the juncture line was found the specimen was moved first 2 mm, then 5 mm, then 10 mm, as indicated by the illustration. All photomicrographs were taken at 125 diameters and the specimen was examined at 600 and 1000 diameters to establish without doubt the identity of the darker portions.

From the photomicrographs it will be seen that the heat-treated structure of the shaft 10 mm from juncture line was not affected; 5 mm from juncture was affected so little that the physical properties would be the same, and 2 mm from the juncture line the physical properties would not be affected more than 10 per cent.

In conclusion, the main feature in welding heat-treated material is to have controlled heat. It is as necessary to regulate the heat of a weld as to regulate the heat in the furnaces in which this shaft was heat treated.



Details of the Automatic Conveyor Furnace for Heat Treating Automobile Frames, as Develbped by the American Metallurgical Corporation, Philadelphia

NEW HEAT TREATING FURNACE

Automatic Moving Floor Air Operated and Preheating Chambers Features

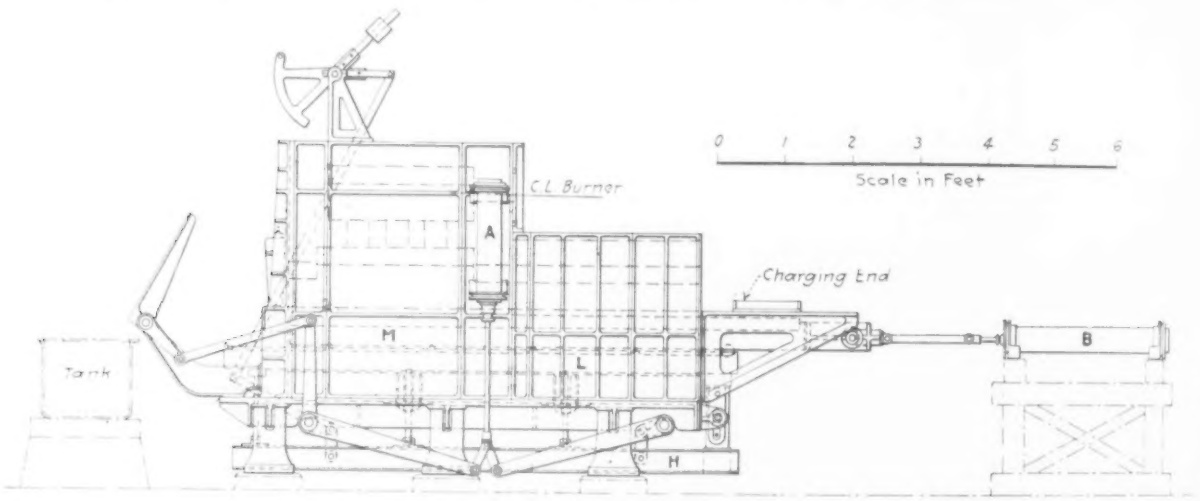
The Advance Furnace & Engineering Co., Springfield, Mass., has placed on the market an automatic moving floor heat treating furnace, the invention of H. A. Kunitz, chief engineer of that corporation, and formerly assistant chief engineer of the Pittsburgh Crucible Steel Co. While similar to the pusher type of furnace, it is of new design. It has no skid rails nor other metal in the floor, all beams being covered with fire tile. Pans or individual pieces of work are not forced one against the other in the furnace and should a pan become warped it does not in any way interfere with the operation.

The material to be treated is carried first through a preheating chamber, which uses the waste gases of the heating chamber, and then through the heating chamber, and at the outlet of the furnace is automatically dumped into the quenching tank. For small parts pans are used, but larger parts, such as crank shafts, connecting rods, cam shafts, wrenches, bars, etc., are placed directly on the covered beams and floor of the furnace.

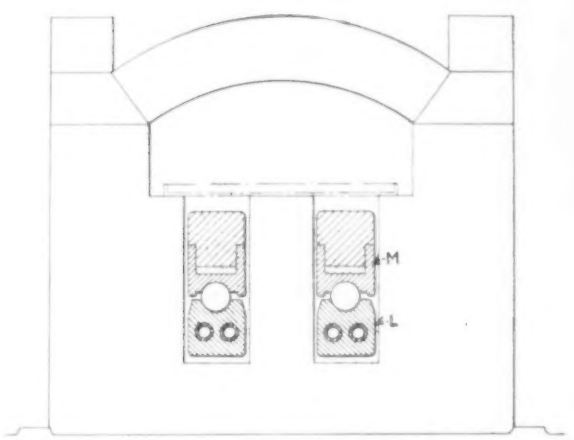
The operation is as follows: In the position shown in the general elevation, the work is in the heating chamber ready for discharging. Cylinder *A*, operated by air, pulls up the rod and the connecting levers and raises the suspended channels *H*, which are connected to beams *L* by rods. On top of beams *L* are the carrying beams *M*, which rest on balls. This movement brings beams *M* above the floor of the chamber, lifting the pans or work with them. At the same time connecting levers open the furnace door, and bring the tilter into the horizontal position ready to receive the charge.

Air is then admitted to cylinder *B*, which pushes forward beam *M*, carrying the entire charge forward and depositing the finished work upon the tilter. Cylinder *A* is then released, which dumps the work into the quenching tank, closes the door, and lowers the remaining and fresh charge to the heating chamber floor. Cylinder *B* then draws back beams *M*, and additional work is placed on the beam at the charging end. Thus the cycle of operation is complete. A device on the tilter holds the pan in place while work is dumped into the quenching tank. When the tilter returns in place, the operator can slide the pans from it to a table at one side, where they are allowed to cool.

It will be noted there is absolutely no dragging of work against the floor tile, as the load is lifted clear vertically, moved ahead and set down vertically. In different sizes the furnace can be adapted to any heat treating or annealing process. One man may, of course, operate two furnaces or more if the period of heat treating is not too abbreviated.



An Air Operated Plunger Lifts the Products Within the Furnace and Another Forces Them Step by Step Through It.



The Lifting Beams Are Protected by Refractory Covering.

The absence of motor drives, with reduction gearing and cams, is regarded as an advantage and another is that cold work is brought up gradually to the quenching temperature. The air cylinders are operated by electric solenoid valves, and can be set for automatic operation at regular intervals at a required rate. The furnace may be furnished for gas or oil and for automatic temperature control. It will be shown in operation at the steel treaters' convention in Philadelphia next week.

The following companies have filed notice of increases of stock with the Pennsylvania state authorities: Pittsburgh Steel Products Co., Pittsburgh, from $2,000,000 to $6,000,000; Pittsburgh Brass Mfg. Co., Pittsburgh, from $30,000 to $40,000; Pittsburgh Bridge & Iron Works, Pittsburgh, from $500,000 to $660,000; Pittsburgh Wire Rope Co., Pittsburgh, from $75,000 to $107,000; Neely Nut & Bolt Co., Pittsburgh, from $10,000 to $25,000; Modern Appliance Co., Pittsburgh, from $25,000 to $50,000; Duquesne Slag Products Co., Pittsburgh, from $15,000 to $814,000; Greene Improvement Co., Pittsburgh, from $65,000 to $100,000.

The Detroit Brass & Malleable Works is now the name of the consolidation of the Detroit Valve & Fittings Co. and the Detroit Brass Works, it not being deemed advisable up to this time to take a name which would likely cause the loss of identity of either of the original constituent companies.

The Dayton Malleable Iron Co., Dayton, Ohio, will establish a chemical and metallurgical laboratory in connection with its plant on West Third Street, to take care of the experimental work of the group of foundries controlled by the Gartland-Haswell-Rentschler interests.

Critical Points in Steel Heat Treatment*

Methods and Apparatus — Commercial Applications with Practical Illustrations— The Human Element As a Factor

—BY ARTHUR W. F. GREEN—

PRONOUNCED advancement in the art of heat treatment of steel in the last few years has been due to the application of theory to practice, and vice versa. The thermocouple, microscope and a large number of kindred appliances, which were little known outside of the purely scientific laboratory comparatively few years ago, are to-day practically indispensable tools of the heat treater. With the general use of scientific instruments in the heat-treatment field has come a more intimate knowledge of the transformation or critical points of iron and steel.

The first mention of the observance of the cooling or recalescence point was made in 1869, when Gore

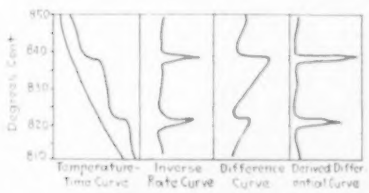


Fig. 1.—Different Types of Cooling Curves (Desch) from Sauveur.

Barrett, in 1873, reported the finding of the heating or decalescence point. Thus "it has been known for some time that the rate of cooling or heating does not proceed uniformly, but that at certain temperatures (which may vary with different compositions) retardation occurs, and these are termed arrestation points, critical points (critical temperatures), transformation or transition points. These are caused by physical changes whereby heat is liberated on cooling and absorbed on heating."

The modern heat treater has at his command apparatus of great precision and a variety of methods for the determination of the critical or transformation points of the steels with which he must work. He can obtain theoretically and practically the correct temperatures to which his steel must be heated in order

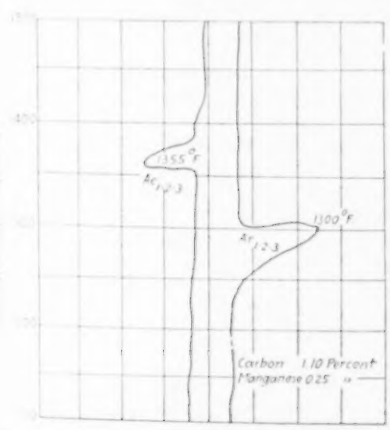


Fig. 3.—Critical Points of a High Carbon Steel as Obtained by a Leeds Northrup Transformation Point Apparatus.

that it may be properly annealed, hardened or otherwise treated. But it is the problem of the heat treater to use the results he obtains in producing commercial returns. If he draws critical temperature curves in his laboratory he must know their application to his equipment and work.

Methods of Determination of Critical Points

The best known methods for the determination of the critical points, based on the use of scientific instruments and knowledge, are the thermal method, metallographic method, calorimetric method, thermo-electric method, melting-points method, magnetic method, and the dilatation method. Most of these methods are best applied in the laboratory with the exception of the melting-points and magnetic forms, which may easily be carried out in the plant proper.

The thermal method is the one most generally used. The critical points are determined by means of curves. There are four distinct types of curves obtainable. They are known as temperature-time curves, difference curves, inverse rate curves, and derived differential curves. Types of these curves are shown in Fig. 1.

The metallographic method is described by Sauveur as follows:

A method for the determination of the critical points, notably of the point A_3. The method for the Ac_3 consists

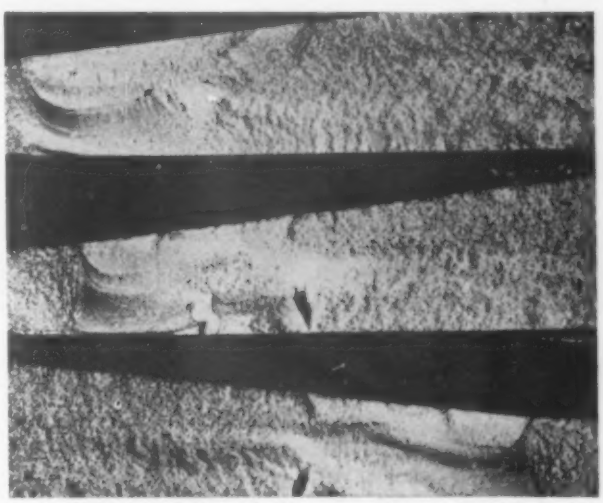


Fig. 2.—Test Bars Prepared by the Alling Method (Brearley).

in noting the temperature at which the reabsorption of ferrite is found to be complete, and for the Ar_3 the temperature at which the rejection of ferrite begins.

The same writer describes the determination of critical points by the calorimetric method in this way:

A. Meuthen (*Ferrum*, 1912, vol. X, p. 1), has determined by the vacuum method of Oberhoffer (Bunsen ice calorimeter and electric resistance furnace) the quantities of heat evolved when iron-carbon alloys cool through their critical points and the method may be used for the determination of these points.

The thermo-electric method "consists in determining the thermo-electro-motive force of the iron or steel in relation to copper."

The melting-points method is one "by which the use of pyrometers may be dispensed with, the method being based on the known melting points of sodium chloride and some other metals in the form of wire."

The magnetic method for the determination of the critical points is based on the fact "that iron-carbon alloys lose their ferromagnetism, or at least the bulk of it, on heating in passing through the points Ac_2, Ac_{2-3}, or Ac_{2-3-1} as the case may be, and recover it in cooling at the points Ar_2, Ar_{2-3} or Ar_{2-3-1}. By observing these magnetic transformations and noting the tem-

*From a paper read before the New York Chapter of the American Steel Treaters' Society. The author is chief of the laboratory of the John Illingworth Steel Co., Philadelphia.

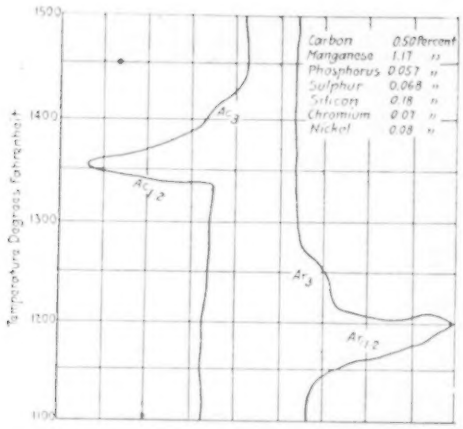


Fig. 4.—Critical Points of Smokeless Gun Steel.

peratures at which they occur, the position of the critical points may be accurately determined."

The dilatation method records the "changes in the rate of expansion and contraction."

Kinds of Apparatus

There are many kinds of appartus on the market which may be used for the determining of the critical or transformation points of steel. Most of these are based on the thermal method, and favor the obtaining of difference curves. The use and efficiency of any of these apparatuses is determined by the manner in which the results are applied to the work and equipment at hand.

It is not absolutely necessary, however, to have elaborate appliances and much scientific knowledge, in order to determine the critical temperatures of steel. Simpler and sometimes very efficient methods may be used. Among these methods are the well-known Metcalf and Alling tests. Brearley describes the Metcalf test as follows:

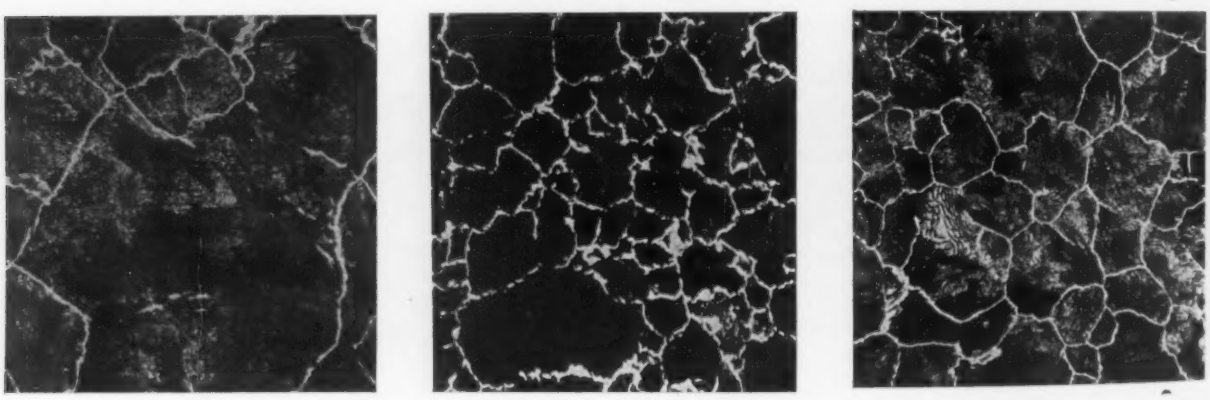
> A bar of the steel being used of about ½-in. in diameter is notched for a length of three or four inches, each 8 or 10 mm. from one end. The notched portion is then heated in the smith's fire until the extreme end is white hot, and in such a manner that the heat tapers gradually backwards. After quenching, the bar is dried and broken at each successive notch. The first piece or two will break off very easily—if they do not break in quenching—and exhibit a course, staring white fracture. Subsequent pieces will break off less readily and become gradually finer in fracture until the smooth amorphous appearance of well-hardened steel with a faint, bluish-grey tinge is reached. After that the fracture gets coarser down to the unhardened part.
>
> The point about this test, which is usually emphasized, is to observe and keep in mind the precise kind of red color which existed in the bar just at the spot where the best fracture was later discovered. The value of the test is obviously more apparent than real.

The Alling test differs from the Metcalf test in that the specimen is notched in such a way that when fractured it is in two pieces, "showing the effect of the varying temperature to which the steel has been heated." Fig. 2 shows such a test.

There are various other tests which may be carried out on much the same lines as the Metcalf and Alling tests. One which has given much satisfaction consists in taking a series of 10 or more samples of the steel being used, and heating them in a furnace equipped with a standardized thermocouple to previously determined temperatures, and quenching them in water or some suitable medium. The samples should be about 2 in. long, about ½ in. in diameter, and notched in the center to make fracture easy. After placing the pieces in the furnace they should be slowly heated to a temperature of 1200 deg. Fahr. This temperature should be maintained for 10 or more minutes to insure thorough saturation. At the end of that time the indicated temperature is carefully noted, as well as the color of the furnace and work. The first piece is then quenched. The temperature of the furnace is now raised 50 deg. Fahr. and the operation repeated with the second sample. This same plan is followed out until the samples are used up. Each time a piece is quenched the indicated temperature and color of the furnace and work is noted. Such a test was carried out, for instance, on a steel containing approximately 1.16 per cent carbon, and 0.35 per cent manganese—a crucible product.

The test described was made without any knowledge of the exact critical points of the steel used. Difference curves were obtained later, by means of a Leeds Northrup transformation point apparatus. A reproduction of these curves is shown in Fig. 3. It was observed that the best fracture was obtained in that sample which had been quenched from an indicated temperature of 1400 deg. Fahr. With the critical points definitely known this was self explanatory since the curves showed that at 1369 deg. Fahr. the Ac_{1-2-3} had taken place. At 1380 deg. Fahr. the curves were again assuming a straight course. Very good results were obtained on samples quenched from 1380 deg. Fahr.

After the critical curves of the steel, which is to be treated, have been obtained, whether by scientific



Figs. 6 to 11.—Photomicrographs (First Two) Reduced About One-third from an Original Diameter of 125, Showing the Effect in Grain Size of Not Observing the Critical Points in Heat Treatment. Photomicrographs (Two Center Ones) Reduced About One-third from an Original Diameter of 125, Fig. 8 Showing That Simple Hardening Could Not Break Up Original

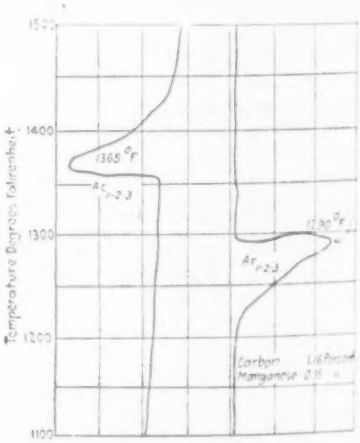


Fig. 5.—Critical Points of One Type of Crucible Steel.

or practical means, the problem of their application to commercial production confronts the heat treater.

Application of Critical Points

There are almost as many kinds of heat-treating equipments as there are materials to be treated. Generally speaking, these equipments consist of furnaces, heating and quenching baths, and temperature indication apparatus. The relation of critical points to equipment has to do chiefly with the method of heat application, thermal control, and the "human element." While there are many kinds of furnaces in use all may be classified primarily as being either of the semi-automatic or continuous type, or the stationary type, which also includes heating baths such as lead, etc. In the former type of furnace the work is carried through the heating chamber in some way and must acquire sufficient heat in transit to allow for proper hardening, etc., to take place. In the latter type the work is placed in the heating chamber or bath and allowed to come up to the desired temperature as quickly as its size will allow.

Thus, given a furnace of either type, a method of temperature indication control and critical curves of the steel to be treated, it should be comparatively easy to obtain the necessary results in heat treatment work. But there are two things which govern the method of procedure. The first of these has to do with the four basic factors of heat treatment—time, temperature, mass and surface, together with saturation. The second is that pyrometers, as generally applied to heat treatment work, do not indicate the temperature of the steel in the furnace, but the temperature in the heating chamber where the point of the thermocouple is.

Two illustrations of the application of critical points to work will show more closely the points which have been discussed. The first has to do with the heat treatment of rifle and machine gun barrels, and the second with the annealing and hardening of threading dies.

Practical Illustrations

One of the steels used extensively during the war in the manufacture of rifle and machine gun barrels was known as smokeless gun steel. The chemical specifications of this steel were:

	Per Cent		Per Cent
Carbon	0.45 to 0.55	Silicon	0.15 to 0.25
Manganese	1.00 to 1.20	Chromium, max.	0.30
Phosphorus, max.	0.06	Nickel, max.	0.30
Sulphur, max.	0.08		

The physical specifications were:

Tensile strength, lb. per sq. in.	110,000
Elastic limit, in lb. per sq. in.	75,000
Elongation in 2 in., per cent.	20.00
Reduction of area, per cent.	45.00

The equipment which was used for carrying on the heat treatment of the rolled blanks was made up of two semi-automatic or continuous furnaces for heating for hardening, a large oil bath fitted with a conveying system and cooling apparatus, and a battery of four under-fired furnaces for tempering. An elaborate pyrometer system was used for temperature indication.

Critical curves of the steel were obtained and are reproduced in Fig. 4. From the data contained in these curves it was decided to treat four pieces of the steel in a small furnace at temperatures of 1450 and 1500 deg. Fahr., and quench them when they appeared to be at the same temperature as indicated by the thermocouple. The pieces were then tempered for two hours at temperatures just under the critical Ac_{1-2} point, namely 1170 and 1200 deg. Fahr. The results of this treatment are shown in the following table:

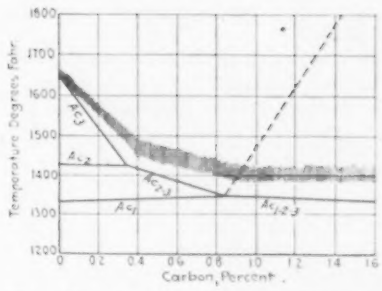


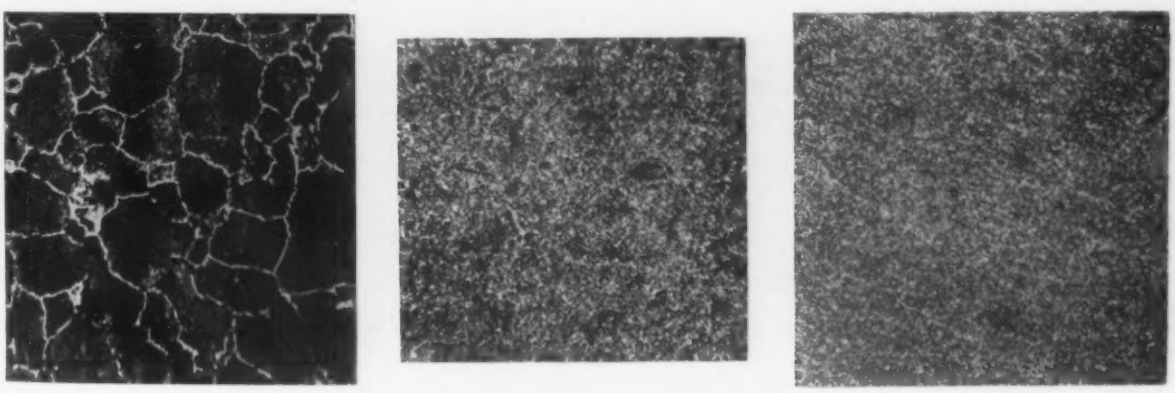
Fig. 12.—A Critical Curve Diagram After Bullens Which Embraces the Entire Carbon Series.

	No. 1	No. 2	No. 3	No. 4
Quenching temperature, deg. Fahr.	1450	1450	1500	1500
Tempering temperature, deg. Fahr.	1170	1200	1200	1170
Tensile strength, lb. per sq. in.	137,700	124,200	114,900	125,000
Elastic limit, lb. per sq. in.	81,000	77,200	84,200	80,400
Elongation in 2 in., per cent.	20.5	21.5	23.0	21.5
Reduction of area, per cent.	45.0	51.0	60.0	52.3

These results were very good, and the determination of the critical points by means of curves, with the application of the data obtained, had doubtless saved much time in securing a good temperature from which to quench the steel. It was then decided to run four samples of the steel from the same bars through the semi-automatic or continuous furnace. Tempering was done under the same conditions as stated for the previous test. The results were not satisfactory as shown in the following table:

	No. 1	No. 2	No. 3	No. 4
Quenching temperature, deg. Fahr.	1450	1450	1500	1500
Tempering temperature, deg. Fahr.	1170	1200	1200	1170
Tensile strength, lb. per sq. in.	106,800	110,700	107,900	108,500
Elastic limit, lb. per sq. in.	67,800	64,000	69,750	70,500
Elongation in 2 in., per cent.	24.0	24.0	25.0	23.5
Reduction of area, per cent.	53.6	52.7	53.0	54.3

Although the same indicated temperatures were used for hardening with the use of the semi-automatic furnace, examination as to why the pieces failed to meet the required tensile test showed that they had not been hardened correctly. The reason was soon discovered. The indicated temperature employed in the continuous furnace was not sufficient to allow the steel to attain a hardening temperature in passing through the chamber. Thus it became necessary to raise the indicated furnace temperature to 1600 deg. Fahr., maintaining the same time element, before the desired results were obtained. Tests made with optical pyrometers on the steel as it came from the furnace, when the high temperature was used for heating, showed that



Coarse Structures of Figs. 6 and 7. Fig. 9 represents the hardened and tempered structure. Photomicrographs (Two at Right) Reduced About One-third from an Original of 125, Representing the Effect of Proper Heat Treatment on the Same Type of Crucible Steel as Shown by Fig. 5. Fig. 11 is the hardened and tempered structure.

the actual quenching temperature of the steel was 1500 to 1520 deg. Fahr.

It is seen from the experience just related that the correct indicated temperature from which to quench the steel for hardening was higher when the continuous furnace was used than that employed in the small furnace first tried. This brings out the relation which existed between the critical temperatures and indicated temperatures in their application to equipment. The use of semi-automatic or continuous furnaces or processes in heat treatment work can be made successful by the application of the four basic factors of heat treatment referred to previously.

The second illustration of the application of critical curves to commercial production has to do with the annealing and hardening of a crucible steel containing approximately 1.10 per cent carbon and 0.35 per cent manganese, used in producing threading dies.

The furnaces employed for annealing and hardening were of the stationary type. Critical points of the steel were obtained and are reproduced in Fig. 5. However, their application was not understood by those who had to do the heat treatment and were practically disregarded. The consequence of so doing will best be understood by referring to the photomicrographs Figs. 6 and 7, and noting the large grain size. The steel was overheated and allowed to remain in the furnace at a high temperature for such a length of time as to make it practically useless. Hardening was tried on some of the material, but the coarse grain structure could not be broken up in a simple hardening operation as shown in photomicrograph Fig. 8. The hardened and tempered structure is shown in Fig. 9.

When the steel was replaced by new material annealing was accomplished, using an indicated temperature of 1420 deg. Fahr., and the result of the treatment at that temperature is shown in Fig. 10. This temperature was determined by the data secured in the obtaining of the critical curves already referred to, and was just over the Ac_{1-2-3} point. The hardened and tempered structure is shown in Fig. 11.

The chief lesson learned from this experience was that of the part which the "human element" plays in a heat treatment process. Consideration of the four basic factors of time, temperature, mass and surface, together with critical point determinations and good equipment, will be of no use, if the factor of the "human element" is neglected.

But there was another lesson learned, that of oversaturation with particular bearing on heating of the steel used at too high a temperature. The soaking of this steel at a temperature considerably over the critical point—which was not, however, a burning temperature—caused grain growth which was too great to break up by heat treatment processes without incurring great expense.

The two treatments which have been considered were specific applications and had to do with two kinds of steel of certain analysis. Fig. 12 is a critical curve diagram which embraces the whole of the carbon series. The shaded portion represents the annealing and hardening range. Data is available as to the effects of certain alloys on the position of the critical points. It has been determined, for instance, that each 0.10 per cent of nickel up to 5 per cent lowers the Ac_1 by approximately 1½ to 2 deg. Fahr.; each 0.10 per cent chromium up to 4 per cent raises the Ac_1 by approximately 3 deg. Fahr.; and each 0.10 per cent manganese up to 30 lowers the Ac_1 by approximately 5 to 6 deg. Fahr.

Conclusions

This paper has considered the methods used for the determining of the critical or transformation points of steel, and has shown the application of critical curves to production, using two specific instances, and a consideration of the critical points generally by referring to the critical curves diagram just referred to.

The chief points which have been stressed were these: First, that no heat treatment can be successfully accomplished without the knowledge of the four basic factors of heat treatment, which are time, temperature, mass and surface; second, that steel to be properly heat treated must be uniformly heated throughout its entire area; and third, that the factor, "human element" is very important. The problems of heat indication and those attendant with equipment have been considered, and conclusions drawn, which showed that these problems are entirely dependent on the principles just outlined.

Critical curve determinations have been shown to be accurate guides in the producing of good results in heat treatment work, when their application has been linked with a knowledge of the factors mentioned.

Therefore, in order that heat treatment may be carried out successfully and efficiently, there must be familiarity with the equipment laid out, a knowledge of the critical points of the steel used, and the application of the four basic factors of heat treatment, together with what may be termed the fifth basic factor, the "human element."

CHARGES TRADE RESTRAINT

Federal Trade Commission's Report on High Prices of Farm Implements

Responding to specific direction by Congress, the Federal Trade Commission has announced publication of its report on "Causes of High Prices of Farm Implements."

The commission finds that the prices of farm implements purchased by the farmers increased on the average 73 per cent during the period 1914 to 1918, and that this increase was due to the following causes:

1. The costs of manufacturers and the expenses of dealers showed a marked increase.

2. The prices of manufacturers and of dealers increased more than their costs or expenses, respectively, and resulted in increased profits, which were unusually large for both manufacturers and dealers in 1917 and 1918.

3. The large increase in the prices and profits of manufacturers in 1917 and 1918 was due in part to price understandings or agreements among manufacturers, and to a more limited extent the increase in the profits of dealers seems to have been due to similar activities.

The commission's conclusions are:

"Farm-implement manufacturers and dealers by concerted action advanced prices in 1917 and 1918 by amounts that were larger than were warranted by the increase in their costs and expenses, and this resulted in unusually large profits for those years.

"In spite of the great increase in farm-implement prices, the farmers were not prevented from making as much profit as before because the prices of farm products increased to an even greater extent.

"The partial dissolution of the International Harvester Co. in 1918 did not change the dominating position of that company in the harvesting-machine line and will not do so while the McCormick and Deering plants and the steel business remain united under its control either directly or by common ownership of stock."

The commission's recommendations are:

"The commission believes that judicial proceedings should be instituted against associations who have been active in restraining trade in the farm-implement industry.

"The commission also believes that the International Harvester case should be reopened as provided for in the final decree, so that a plan of dissolution be arrived at that will restore competitive conditions in the harvesting-machine business."

Ten teams, representing various departments of the Bethlehem Steel Co., Sparrows Point, Md., on Saturday, Sept. 4, took part in the preliminary first aid meet conducted by the company. The finals, in which all the plants of the company will take part, will be held at Bethlehem on Sept. 25.

Stress Results within Elastic Limit

Term Recoverance Defined—Methods and Instrument for Obtaining Property Described—Data on Tests of Different Materials Included

RECOVERANCE, which is the title of a monograph prepared by Robert G. Guthrie, Widney Test Laboratories, Chicago, is defined by the author as "the capacity of a material to return immediately the energy that has been imparted to it by any external force," and is said to be inherent in all matter to a greater or lesser degree.

The measurement of this property may be accomplished with the Widney modulimeter, illustrated herewith, which is provided with knife edges, 4 in. apart, on which the test piece is placed and with a plunger connected to a third knife and a gage graduated in thousandths of an inch directly connected to the plunger, which in turn is connected to a loading platform. Data are obtained by placing predetermined loads in successive equal increments on the loading platform and after each increment reading the deflection. Likewise readings are taken when each decrement is removed. The resultant then is a loading curve and an unloading curve and the ratio of area beneath the unloading curve to the total area under the loading curve is the per cent recoverance.

Fatigue Indicated by Recoverance

"The recoverance of a material is a direct indicator of the material's ability to withstand fatigue, but recoverance alone is not a conclusive measure of a material's susceptibility to fatigue," says Mr. Guthrie. The definition of fatigue as given in Merriman's "Mechanics of Materials" is "the loss of molecular strength under stress often repeated." Recoverance, as stated in this article, is the result of stress within the elastic limit. Fatigue ultimate is the point at which failure occurs when a material has been subjected to oft repeated stresses within its elastic limit. The discussion is in part as follows:

The direct factors in fatigue are the number, frequency and magnitude of stresses. It follows then that any material will fatigue and ultimately fail when the rate of repetitions of stress of any magnitude, within the elastic limit, is greater than the rate of recoverance, and, conversely, there will be no fatigue when the rate of repetitions of stress, of any magnitude, within the elastic limit, is less than the rate of recoverance. There is, however, a recoverance beyond the elastic limit.

Explanation of Curves

Recoverance curves are shown in the accompanying illustration. Curve H shows how the material was loaded to twenty increments, giving a certain deflection. This material was then unloaded and a slight loop developed, although the material came back to the point of beginning when all the load was removed. The resultant of the subtraction of the area of this loop from the total area underneath the increment curve is the recoverance area.

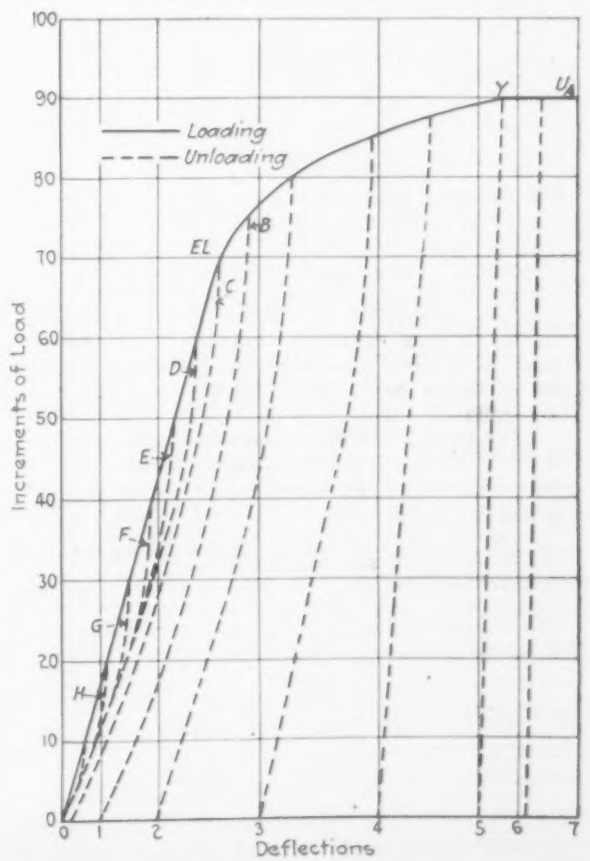
It will be noticed from this loop that the loading line and the unloading line do not coincide throughout their lengths. This shows how there is a loss when the material is gradually loaded in successive equal increments and unloaded in exactly the reverse order.

The unloading line does not come back on the same points as the loading line, although if the total stress applied is within the elastic limit, the last point will be at the point of beginning, as previously stated. It is obvious, then, from the foregoing that when a material is subjected to repeated stresses, there will be as many of these loops formed as there are complete cycles of stress, and inasmuch as the area bounded by a loop represents a loss in strength to the material, it can be seen that, providing the rate of repetitions of stress is greater than the rate of recoverance, a certain per cent of this loop would be held over from one repetition to the next. As the repetitions continue, the magnitude of this loop increases, as shown by curves *G*, *F*, *E*, *D*, *C*, *B* and *A*, until the curve *C* is reached. This curve does not come back to the origin, *O*, and consequently at this curve the elastic limit is reached, and the material takes a permanent set. The loss then will not only be by the divergence of the unloading line from the loading line, which loss, were it in any curve such as *D* or *E* would be recoverable and would depend on a time factor, but there will also be a permanent loss represented by the distance *O*—*O'*, a small part of which may be recoverable over a period of time due to recoverance beyond the elastic limit. Providing these repetitions of stress were continued, the point *A* would finally be reached, at which point the decrement line would cease to exist and this point would be the ultimate failure of the material, or, in other words, the fatigue ultimate.

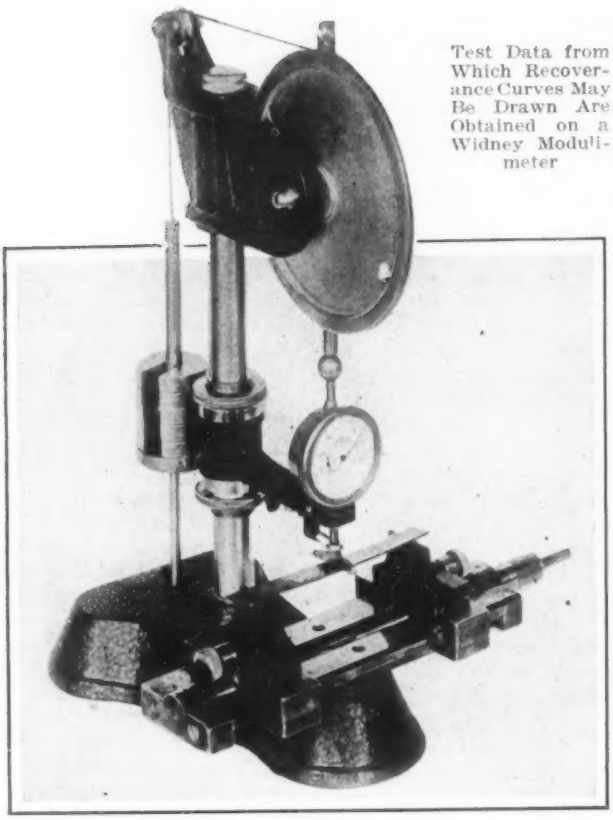
The curves illustrated do not show all of the cycles of stress with their percentages of recoverance held over to the next time, but merely show the succession of hysteresis loops to illustrate the theory already outlined. The curves were not plotted from an actual test on one material, but were compiled from numerous tests on various metal bars.

Conclusions from Recoverance Test Data

Where a difference in recoverance exists between two metals either similar or dissimilar, amounting to less than 1 per cent, it may be neglected and the metals characterized as having the same recoverance. Results of tests given in Table I, for example show that steel No. 1 has an average recoverance of 100 per cent, whereas with pure Swedish bar iron the average re-



Recoverance Curves Which Show How There Is a Loss When the Material Is Gradually Loaded in Successive Increments and Unloaded in Exactly the Reverse Order



Test Data from Which Recoverance Curves May Be Drawn Are Obtained on a Widney Modulimeter

coverance is 98.8 per cent. The difference may be stated then as 1.2 per cent. Referring further to Table II it will be noted that the tests on standard steel, No. 4 sample—as is, show 100 per cent recoverance and for No. 4, magnetized sample, 99.8 per cent recoverance, the difference being 0.2 per cent. This metal was practically the same before as after treatment.

After carefully examining the data resulting from the tests of the various metals given herewith, a further theory may be advanced regarding recoverance as applied to metals, also theories regarding the reasons for recoverance. The recoverance of a metal, for instance, is governed by its chemical and physical homogeneity, and to a certain extent by its fineness of structure, *i. e.*, if it were possible to obtain a metal of a solid solution and approaching a non-crystallin stage, it would follow that this material would have an extremely high recoverance as well as a high fatigue value.

Metals have been found averaging 100 per cent recoverance, but 100 per cent recoverance absolute is not possessed by any material, for this 100 per cent recoverance figure is obtained on an instrument which is not mechanically perfect. The statements regarding chemical and physical homogeneity and fineness of structure are based on the following:

Referring again to Table I steel sample No. 1, which was in the sorbitic condition, and which showed every evidence of an excellent structure, tested 100 per cent recoverance. The obvious opposite of this material is a gray cast iron, samples No. 1, No. 2 and No. 3. These were three samples cut from the same bar. The difference of the average of the three averages of these three samples as against the steel is 7.2 per cent, and further the range of the three tests of cast iron No. 2, is 3.8 per cent, whereas cast iron No. 3 has a range of only 0.4 per cent, and cast iron No. 1 has a range of 7.5 per cent. It is obvious that this cast iron is extremely variable as regards recoverance, and also as regards stiffness, which is no more than should be expected from a bar of this material. It may also be noted that the average recoverance of the aluminum, samples No. 1 and No. 2, Table I, is practically that of the steel, and according to the theory, this would be expected from the fact that the aluminum was of good quality and although not of the fineness of structure of the steel, the two are somewhat

Table I.—Recoverance Tests of Various Metals

Sample	Number of Increments	Recoverance, Per Cent: Values	Range	Average	After 3-hr. Rest	Stiffness: Deflection In.	Average
Steel No. 1	10	1st test.....100 2d test.....100 3d test..... ..	0	100	100	1st test.....0.020 2d test..... .020	100
Pure Swedish bar iron	10	1st test..... 98.0 2d test..... 99.2 3d test..... 99.4	1.4	98.8	94.0	1st test..... .025	80
Rolled brass No. 1	10	1st test..... 99.5 2d test..... 99.8 3d test..... 99.7	.3	99.6	96.8	1st test..... .033 2d test..... .033	60.6
Rolled brass No. 2	10	1st test..... 99.6 2d test..... 99.8 3d test..... 99.8	.2	99.7	99.4	1st test..... .035 2d test..... .035	57.1
Cast iron No. 2	5	1st test..... 93.6 2d test..... 95.0 3d test..... 97.4	3.8	95.3	93.5	1st test..... .044 2d test..... .042	46.5
Rolled aluminum No. 2	6	1st test..... 98.4 2d test..... 98.8 3d test..... 99.5	1.1	98.9	93.0	1st test..... .049	40.8
Cast brass No. 1	8	1st test..... 98.5 2d test..... 98.4 3d test 98.6	.2	98.5	97.9	1st test..... .051 2d test..... .050	39.6
Cast iron No. 1	5	1st test..... 89.0 2d test..... 92.0 3d test..... 84.5	7.5	88.5	93.2	1st test..... .056 2d test..... .0505	37.5
Rolled aluminum No. 1	5	1st test.....100 2d test..... 99.3 3d test..... 99.3	.7	99.5	99.4	1st test..... .054	37.0
Cast brass No. 2	8	1st test..... 97.9 2d test..... 98.4 3d test..... 98.9	1.0	98.4	96.9	1st test..... .056	35.7
Cast iron No. 3	5	1st test..... 93.6 2d test..... 94.0 3d test..... 94.0	.4	93.8	91.0	1st test..... .058 2d test..... .0635	32.8
Cast aluminum No. 2	5	1st test..... 99.6 2d test..... 99.1 3d test..... 99.1	.5	99.2	...	1st test..... .064	31.2
Cast aluminum No. 1	5	1st test..... 98.5 2d test..... 99.1 3d test..... 99.6	1.1	99.0	98.4	1st test..... .0835	23.9

Dimensions of each sample 0.05 in. x 0.25 in. x 4¾ in. Type X instrument used with knife edges at a 4 in. span. Weight of each increment, 3.8 oz. All stiffness tests made under a 5 increment load.

related as regards their chemical and physical homogeneity.

Stiffness values in the last column Table I, of aluminum are only one-fourth and one-third that of the steel, notwithstanding the fact that the recoverance is practically the same. In the case of the Swedish bar iron a recoverance comparably less than that of the steel but approximately that of the aluminum is shown, and contrary to the comparison of the aluminum and the steel, which showed practically the same recoverance and a very low stiffness value, the Swedish iron has a very much higher stiffness value than any of the aluminums, but the recoverances are almost the same.

In the case of the brasses, the recoverance is practically the same as is their stiffness, but as in the case of the cast brass, their recoverance is almost the same as is their stiffness. The stiffness of the cast brass sample No. 2, Table I, is only about half that of the stiffness of the rolled brass, and the difference of their recoverances is only 0.2 per cent over the limit set as a comparable difference.

Data on the metals as given in Table I, indicate that the metals have practically nothing in common as regards their so-called physical properties, with the possible exception of their structure as revealed under the microscope. It is meant by this that the physical properties of a presumably pure cast aluminum, sample No. 2, Table I, for example, and of a sorbitic steel, sample No. 1, are exceptionably far apart as regards their tensile strengths, elastic limits, elongations, reduction of area, etc., but that the aluminum as an elemental metal, is approaching the state of chemical homogeneity, and also that the steel, sample No. 1, is approaching the state of chemical homogeneity as a solid solution, and although their structures physically are somewhat different, it is evident that the further these metals get away from the mechanical mixture state, the higher will be their recoverance. The foregoing must not be construed as meaning that aluminum could be used in the place of steel, simply because their recoverances are the same, or nearly so but that from any given number of bars of like material, the one highest in recoverance should be the one chosen for parts to be subjected to fatigue.

Table II.—Tests of Recoverance of Steel Samples

Sample No. and Description	Rest Test Per Cent	Regular Tests. Per Cent 1	2	3	4	Av. Regular Tests
No. 3—as is.....	97.5	99.5	99.8	99.9	98.5	99.4
No. 3—burned...	90.3	96.2	95.5	96.2	...	95.9
No. 4—as is.....100		100	100	100	...	100
No. 4—magnetiz'd Side X	97.4	99.4	100	100	...	99.7
No. 5—badly burned in forge	92.0	96.3	94.8	96.5	...	95.8
No. 6—as is.....	90.8	98.6	99.4	99.0	...	99
No. 6—ground in several places and slightly annealed.....	...	100	99.9	...	...	99
No. 6—after burning and deformation	97.8	98.9	98.4	98.5	...	98.6

Five loads of 118 gram increments in all except No. 5 sample, for which there were eight loadings of 100 grams each.

It will be noticed in Table I, in the column designated "After 3 hr. rest," that in all the instances with the exceptions of samples steel No. 1 and rolled brass No. 1, the recoverance value of a rest test is considerably lower than are the tests that immediately follow, characterized as "regular tests."

When the material is at rest, the molecules possess potential energy, but due to the state of rest it is not necessary for these molecules to change the energy from the potential to the kinetic state, *i. e.*, there is no greater amount of energy possessed by the molecules during the regular tests, or in other words, after they have been disturbed, than before, but there is a greater outward manifestation of the energy that is inherent in the molecules due to the excitation by external force of their intra-atomic and intra-molecular activity.

If this line of reasoning be carried still further, it may be said that a super-excitation of this intra-activity is produced which increases in magnitude and intensity with the increase of external stress, until there is a point reached where this internal strain or this intra-activity is so intense that the molecules disrupt themselves in such a way as to cause an outward manifestation either across or along the planes of the crystals and still more apparent manifestations of probably a macroscopic nature inter- or intra-granular and finally a complete failure of the material under stress.

It is sometimes noticed that the path of a fissure may be either intra- or inter-crystallin, and this is evidently due to (1) what might be characterized as a series of weak or damaged crystals, (2) highly localized strains set up at these points or highly localized intra-activity which in turn will follow as a natural consequence from the aforementioned weak crystals. The unit intensity or localization of this super-intra activity is evidently made possible by the original set of weak crystals.

This molecular power must be very great inasmuch as a material requires considerable work performed upon it before it will ultimately fail as in the case of a fatigue test. If a curve of this internal molecular resisting force could be plotted, it would obviously start very slightly below its peak, rise abruptly from this point to the peak and continue in practically a straight line very slightly dropping toward fatigue ultimate for an infinite distance. The measure of the fall and length of this peak line would be determined by two factors, the rate of repetitions of stress regardless of their individual magnitude and the magnitude, providing it was great enough regardless of the rate of repetition.

It should be possible under ideal conditions for a point of equilibrium to be established wherein the magnitude and rate of repetitions of stress would be exactly equal to the rate of recoverance, and then this line, other things being equal, would continue as an absolutely straight line forever.

Railroad Workers Get More Money for Less Work

During the time that the railroads were in the hands of the Government, the efficiency of the workman steadily decreased and because of the resulting decrease in production in spite of large increases in wages some of the railroads are looking for a reimbursement from the Government for the loss brought about thereby.

The Kansas City, Southern Railroad, for instance, has prepared a brief in which it sets forth the fact that while wages per hour have in some instances increased 100 per cent or more, the amount of work accomplished in an hour has decreased more than 25 per cent. As examples, it is recited, the job of disconnecting a firebox from its boiler which took 25 hr. befor the Government took control now takes 36 hr.; for flanging sheets, the time has increased from 75 hr. to 104 hr. and threading staybolts and drilling telltale holes from 92 hr. to 130 hr.

In this brief the Kansas City Southern asks that in fixing the amount of maintenance funds to be paid the railroad the Government take into consideration "not only the increase in the amount of the wage unit over the amount of the wage unit in operation for the three year period prior to June 30, 1917, but the decrease in the amount of labor productivity the increased wage unit will purchase at present and has purchased since the Government took over the railroads as compared with the amount of labor production purchasable with the smaller wage unit before the Government took over the rail lines."

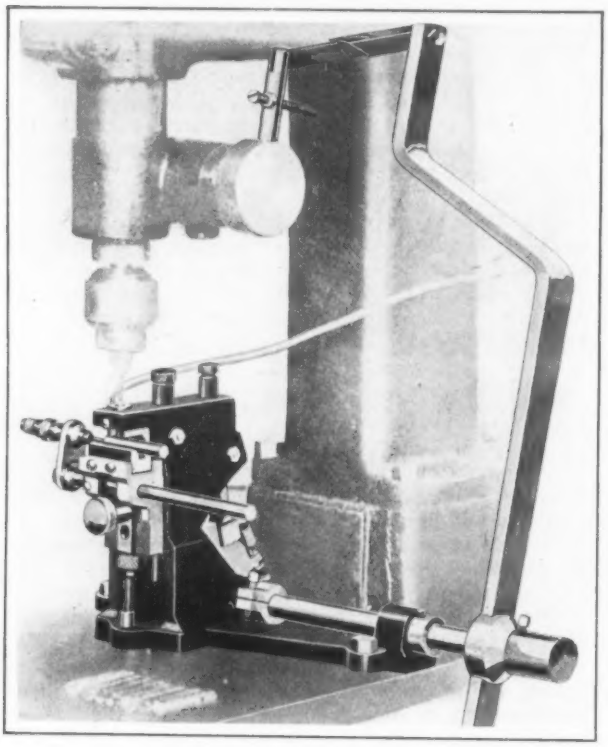
It is figured that if a favorable ruling regarding this contention should go into effect more than one billion dollars additional would have to be paid out by the Government to the railroads.

Approximately 1000 employees of the Bethlehem Ship Building Corporation, Ltd., Fore River Works, Quincy, Mass., have voted to strike and are waiting for sanction of the international headquarters. The company employs about 7000.

Semi-Automatic Drill Jig

A semi-automatic drill jig marketed under the trade name Adjusto and designed to eliminate unnecessary handling in the drilling of small steel and brass parts that have to be drilled in jigs on high-speed drill presses, is manufactured by the Automatic Drill Tool Co., 549 West Washington Boulevard, Chicago. The drill jig automatically clamps the part, trips and returns the spindle of the press at the proper depth, unclamps and ejects the part. All these functions, including the actual drilling, are operated by a foot lever which connects with an operating rod in the jig, leaving the operator's hands free for feeding the parts.

The jig is attached to a table of the drill press by two sets of screws. It is designed with standard holding block for round, square or hexagon parts. The holding block, however, is removable and can be shaped up for flat or odd-shaped pieces. The jig is adjustable for various sizes of parts up to 1 in. in diameter, and is also adjustable for location of hole and depth of drilling. Special connections are made on the jig for multiple spindle heads in multiple drilling and also step gages for location of two or more holes at different angles. The manufacturer states that the part can be inserted in the jig, properly gaged for hole, clamped and the drill started in one second.



Foot Lever Operated Drill Jig Which Automatically Clamps the Part, Trips and Returns the Spindle of the Press at the Proper Depth, Unclamps and Ejects the Part

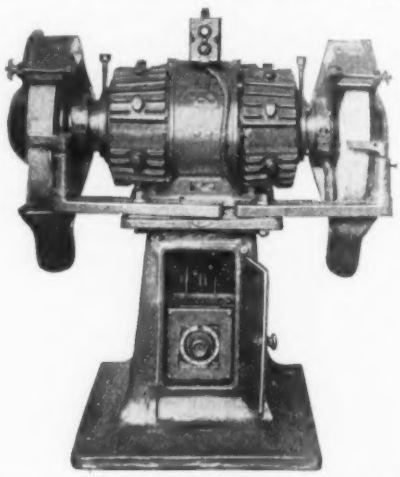
Alloy Steels in the Automotive Industry

Some applications of alloy steels in the automotive industry were discussed by H. J. French, metallurgical division, Bureau of Standards, Washington, in a paper presented at a meeting of the Washington section of the American Society of Mechanical Engineers, March 31, and reprinted in the September issue of the journal of the society, 29 West Thirty-ninth Street, New York. The paper discusses structural nickel-chromium and carbon-chromium steels, with particular reference to the uses of steel containing 1 per cent nickel and 1 per cent chromium, and steel with 3 per cent nickel and 1 per cent chromium. Data are given for these two steels showing the tensile properties and hardness developed in small-size rounds subjected to varying heat treatments.

Treatments of nickel chromium steels used for gears and airplane-engine crankshafts are discussed somewhat in detail, and important difficulties frequently met with in the production of crankshafts are noted. "Streaks" and "temper brittleness," both encountered in the use of nickel-chromium steels, are briefly discussed, and curves showing the tensile properties and hardness of "stainless steel" under varying oil-quenching and tempering treatments are presented. There are also shown the results of cutting tests made with cast high-speed steel milling cutters and a comparison is given with high-speed cutters made by present-day ordinary methods. Micrographs are included to show the refractory nature of the carbide in cast high-speed steel.

Self-Contained Motor Driven Tool Grinder

Ease of starting and total inclosure of motor and control apparatus are the features of the motor-driven tool grinder just placed upon the market by the United States Tool Co., Cincinnati. The grinder shown in the accompanying illustration is equipped with a 5-hp. direct-current, adjustable speed, 1120 to 1600 r.p.m., 230-volt Westinghouse motor, started or stopped from a push button on the top of the motor frame. This push button actuates a type C Westinghouse starter with a speed-adjusting rheostat, all located in the bottom of the machine frame.



Motor Driven Tool Grinder with the Motor and Control Apparatus Totally Inclosed

On previous machines of similar type the push button stations were mounted directly in front of the motor frame, but it was found that the workman in using the grinder would start the motor by jabbing the button with the material which he intended to grind. With the new position for the buttons it is easier for the workman to operate it with his hand than with the tool, thus to eliminate misuse.

Civil Service Examinations Announced

The United States Civil Service Commission announces examinations by mail as follows: Metallurgical laboratorian at $4.80 per day (form 1312), the duties including physical tests, heat treatment and metallographic examination of metals, calibration of instruments, calculation and plotting of results of tests, etc.; laboratory aid at $4 per day (form 2118), the duties being to assist in work connected with the heat treatment of forgings, dies, tools, and the output of steel foundries; catalytical chemist at $3,000 to $4,000 per year, assistant catalytical chemist at $2,000 to $3,000 per year, junior catalytical chemist at $1,600 to $2,000 per year (form 1312); laboratory assistant, intermediate grade, at $1,080 per year; laboratory assistant, junior grade, at $1,000 per year, and senior aid at $900 per year (form 1312); associate physicist, qualified in physical metallurgy, at $2,000 to $2,800; assistant physicist, qualified in physical metallurgy, at $1,400 to $1,800 (form 1312). Applicants should apply for the form given, stating the title of the examination desired, to the Civil Service Commission, Washington, or the secretary of the United States Civil Service Board at a Federal building in one of the larger cities.

SPOTTING CHARGES

Interstate Commerce Commission Decides It Has No Power to Require Carriers to Pay Allowances

WASHINGTON, Sept. 7.—Although only a week ago the Interstate Commerce Commission emphasized its decision that every railroad must treat all competing concerns alike in performing spotting service or paying allowances for it, the commission has just issued a new decision, declaring that it has "no power to require carriers to pay allowances to shippers for spotting." It is merely interested in enforcing impartial treatment.

The newest decision covers the ground exhaustively. It dismisses the complaint of the Buckeye Steel Castings Co., which has an extensive steel plant at South Columbus, Ohio, adjacent to the tracks of the Hocking Valley and the Toledo & Ohio Central railroad companies. With its own engines and at its own expense, it performs the switching within its plant to and from points of loading and unloading, on all inbound and outbound traffic. The company asks that the Hocking Valley Railroad be required to pay it an allowance equal to the cost of performing the service.

"It should be stated at the outset," says the report of the commission, "that we have no power to require the carriers to pay allowances to shippers for spotting. If the service is a transportation duty the carriers may elect either to do it themselves or to hire the shipper to do it for them at cost. Their practices in this respect, however, must be free from undue prejudice. In this particular case the defendants, at the hearing, signified their willingness to do the spotting if the complainant would demand it, but complainant did not and does not demand it, and prefers to do the work itself. The only question that remains for consideration, therefore, is whether the complainant was or is subjected to undue prejudice by reason of the defendants' refusal of an allowance.

Spotting for Others

"Considerable evidence was offered by the complainant to establish this fact, it being shown that the defendants performed spotting or granted allowances to certain other shippers. The fact that defendant carriers do the spotting for others is not very material to the issue. They are ready and willing to give complainant the same sort of service that they give others similarly situated, but complainant does not desire it. The Hocking Valley as early as July, 1915, expressed its willingness to do the spotting, but the offer was never accepted. Any advantages that accrue to the shippers that accept spotting service are not necessarily due to shortcomings of defendants, but rather to the position which complainant has assumed.

Allowances by Carriers

"Complainants' principal products are freight car, locomotive, and other castings, including electric steel castings. The raw materials it uses comprise scrap iron, pig iron, fluxing stone, molding sand, ferromanganese, magnesite, and numerous other commodities, as well as gas and steam coal. Allowances in lieu of spotting are granted to a number of shippers in Central Freight Association territory, some of whom are engaged, to an extent, at least, in the same general line of business as complainant and compete with it in the purchase of raw materials and the sale of manufactured products. Complainant refers especially to the Stewart Iron Co. and the National Malleable Castings Co. at Sharon, Pa., and to the Sharon Steel Hoop Co., Farrell, Pa., all of which are granted allowances by the carriers serving them. None of them are served, however, by the companies that are defendant carriers in this case. There are only two instances in which the defendant companies make allowances in lieu of the performance of spotting. The Marion Steel Shovel Co., Marion, Ohio, receives an allowance of $1.60 per car from the Hocking Valley and the Jeffrey Mfg. Co. at Columbus receives an allowance of $1.49 per car from the Toledo & Ohio Central. The Hocking Valley asserts that the allowance to the Marion company is made mainly because the type of locomotives in yard use at Marion cannot operate successfully at the plant. Facts of this sort have been urged in other cases as a reason why a carrier should neither perform spotting nor make an allowance. The Jeffrey company is not located on the tracks of the Toledo & Ohio Central and apparently the allowance is made to meet the action of other lines. There is no evidence to the effect that these two shippers are engaged in the same business as complainant.

"The record shows no specific instance in which an industry on the defendant carrier's lines, engaged in the same general line of business as complainant, is given an allowance. Complainant urges that during the period of Federal control the Director General of Railroads is answerable for any unwarranted preference afforded complainant's competitors located on any federally controlled road, but no conclusive evidence was offered to show that complainant was damaged by reason of the alleged undue prejudice. Damages are not measured solely by the cost to the complainant of performing the spotting. Complainant preferred to perform this service for its own convenience, and is now requesting compensation therefor.

"We find that the complainant has not shown that it was damaged by reason of the alleged undue prejudice during the period of federal control, and that the refusal of defendant carriers to pay an allowance to complainant for the service in question does not subject complainant to undue prejudice of disadvantage."

Brown-Wales Co. Fifty Years Old

The Brown-Wales Co., Boston, iron and steel, is celebrating the fiftieth anniversary of its founding. The company had a humble beginning. To-day it operates one of the largest warehouses in New England at Fargo and Egmont streets, South Boston, and another large establishment in the Dorchester district of Boston. It carries materials used by machinists, iron workers, structural shops, sheet metal workers, tinners, roofers, etc. It operates motor trucks for local, freight house and boat deliveries.

Josiah Bacon started in the iron and steel business on Fulton Street in 1869. In the following year John G. Brown, salesman of Gay Manson & Co., Boston, became associated with him. They continued as partners for about seven years, and Mr. Brown then bought out Mr. Bacon's interest. Mr. Brown continued the business alone for a while, but subsequently took in Manley McClure, who also was in the iron and steel business, and the firm name became Brown, McClure & Co. This partnership continued until 1890, when William Q. Wales, who was in the sheet metal business, became associated with these two gentlemen, and the firm name became Brown, McClure & Wales.

Two years later Mr. McClure, owing to poor health, withdrew from the concern, and the firm name became Brown & Wales, this partnership continuing until 1903, when they incorporated under the firm name of Brown-Wales Co. In 1908 Mr. Brown, then president of the company, died. Since then the business has been conducted practically under the same management. The present officers are: William Q. Wales, president and treasurer; Quincy W. Wales, assistant treasurer, and William H. Shurtleff, secretary.

A concerted drive to organize all the workers in the various branches of the metal trades throughout New England has been launched along the same lines followed in an effort to unionize the steel workers. The American Federation of Labor is conducting the drive on the strength of its recent "victory" over the United Shoe Machinery Corporation, Beverly, Mass. According to court records, the Beverly company won the strike. The organization of metal workers is progressing very slowly.

The fourteenth annual meeting of the American Canners' Association will be held at Atlantic City, N. J., on Jan. 17-21, 1921. The machinery exhibit will be held on Young's Pier which will be heated for the purpose.

Association Lessens Labor Difficulties

Industrial Situation Stabilized in Hartford County, Conn., by Co-operative Organization of 160 Manufacturers

BY GERARD FRAZAR

THE leading manufactories of Hartford County, Conn., are and for some time have been remarkably free from labor disturbances. This fact to a very large extent is due to the activities of the Manufacturers' Association of Hartford County, with headquarters at 142 Russ Street, Hartford. This organization represents 160 plants, employing normally 70,000 persons. It maintains branches at New Britain and at Bristol, Conn., and all towns where one or more important industries are located are in constant communication with one of the three association divisional headquarters.

Douglas H. Thomson, Terry Steam Turbine Co., Hartford, is president of the association; Carlisle H. Baldwin, vice-president American Hardware Corporation, New Britain, is first vice-president; M. S. Little, general manager M. S. Little Mfg. Co., Hartford, is second vice-president, and Bryant H. Blood, head of the Pratt & Whitney Co., is treasurer. Thomas J. Kelley, a former Hartford newspaper man, is manager of the association, and all members credit him with much of its success.

Partisans of Open Shop

While Mr. Kelley's qualifications are as stated by the association's officers and members, the success of the organization is due to co-operation among its members. There are similar organizations in New England that function along lines put down by this Hartford County association. Yet these other organizations, although efficient to a marked degree, have not handled labor questions as the Hartford County association has, because there has not been the same spirit of co-operation and determination to abide by decided policies among their memberships. During the past 19 years the Hartford County association has experienced few serious labor disputes, and in that time never has failed to win its point.

The members of the Manufacturers' Association of Hartford County are partisans of the open shop. They have absolutely no objection to the men's organizing, but they do strenuously object to union leadership and what this leadership stands for. They believe in paying employees wages equal to or higher than the regular union schedule for corresponding work in other sections of the country, and they claim to practice what they preach.

In fact, they believe in paying a man what he is worth, not one cent more or less. If an employee is worth 90 cents per hour, he is paid 90 cents; if worth more, he is entitled to more; if less, his compensation is so regulated. The association members are most emphatic in their belief that union officials shall not say what a man's pay shall be irrespective of his productive qualifications. Employees should earn what they are paid; they should have the opportunity to advance through personal endeavor and not be held back by petty union leadership policies; they should have sanitary, healthy work rooms and homes; they should be treated as men, not parts of an organization; in other words, the individual man is given a chance. These are some of the beliefs of the members of this Hartford County association.

The association violates no law. Under the Connecticut statutes it functions well within its rights.

Newspaper Advertisements Disappear

Because of labor unrest throughout the country, the Hartford County Association, about a year ago, decided to make an effort to stabilize the situation insofar as it applied to its members. The association does not claim complete success to-day by any means, but it does maintain it is accomplishing something along lines laid down.

Hartford is a city, according to the 1920 census, of 138,036 population. It is the most active industrial center of Connecticut; its industries, both large and small, in a majority of cases, function in iron and steel in some form. Its industries therefore are dependent upon a supply of skilled labor such as tool makers, machinists and the like, as well as semi-skilled help, such as is employed in foundries, typewriter factories, etc. New Britain and Bristol are other large manufacturing centers dependent upon such labor, and Hartford County boasts of other important industrial centers.

No manufacturer in this section of the country had sufficient labor. One might justly suppose the Hartford newspapers would be flooded with want advertisements for help. It has been said that our industrial concerns, in a comparatively short period, recently expended $50,000,000 in hiring help away from each other. The Hartford County Association members, first of all, agreed not to hire help away from each other. It was argued that everybody, by advertising in the newspapers, created unrest and invited an increase in wages of labor.

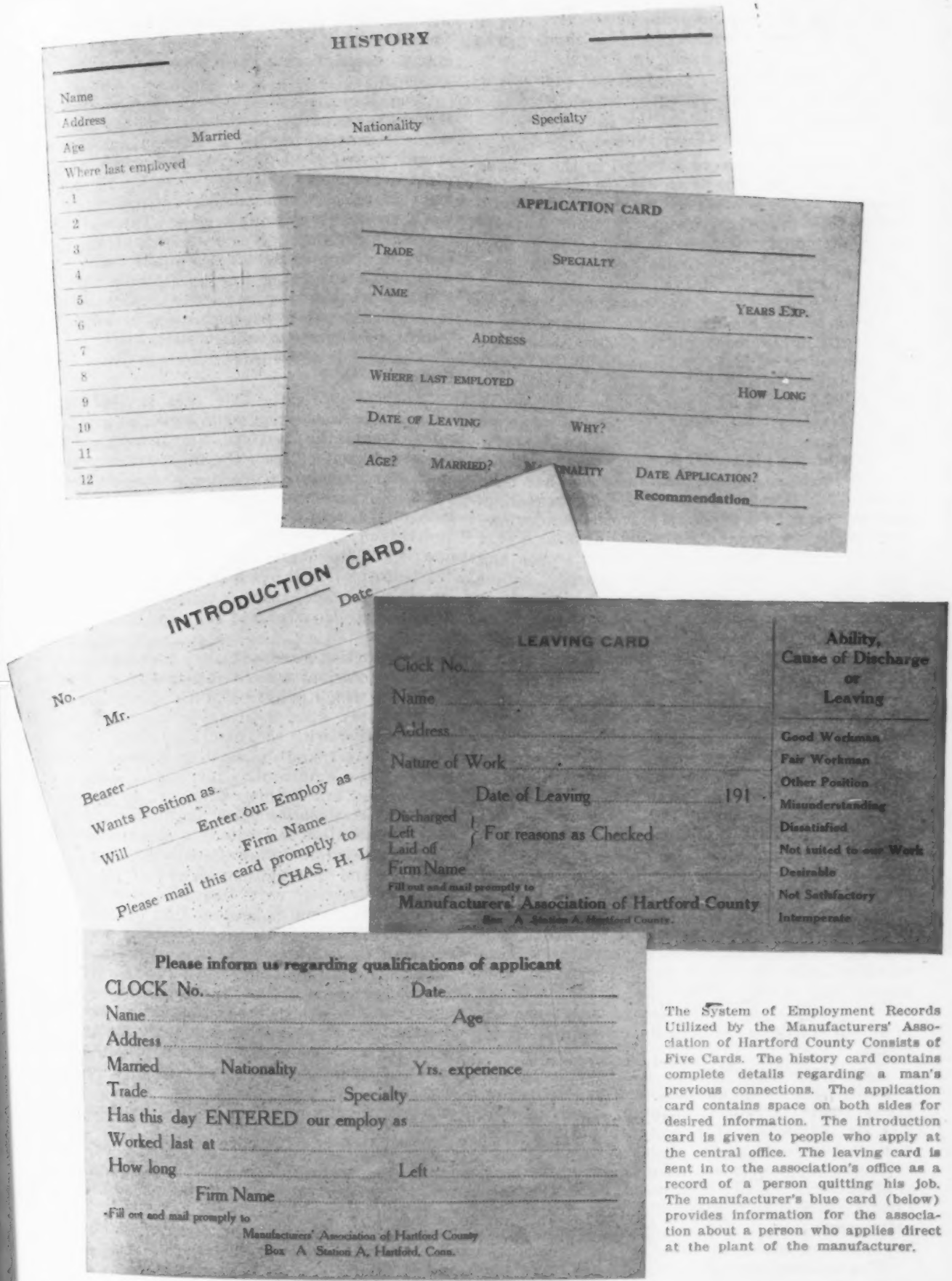
They not only stopped hiring help away from each other, but they succeeded in keeping advertisements of industries located in other sections of the country out of the Hartford newspapers, and refrained from such advertising themselves.

Foremen Chief Offenders

Business concerns holding a membership in the association soon discovered that with the newspaper advertisements omitted, the chief offenders in the matter of non-solicitation were the foremen of member plants. These foremen, believing their positions depended on production, were the first to find fault when a man in their department was lost through solicitation, and the first to consider themselves clever when they stole away a workman from some other foreman.

Heads of concerns are periodically getting together their foremen and telling them that while their efforts are appreciated, such tactics, if continued, will do more harm than good. They are made to understand that each plant in Hartford County must stand its portion of the labor shortage, production or no production.

In addition, clubs of employment department heads, which meet once a month, have been



The System of Employment Records Utilized by the Manufacturers' Association of Hartford County Consists of Five Cards. The history card contains complete details regarding a man's previous connections. The application card contains space on both sides for desired information. The introduction card is given to people who apply at the central office. The leaving card is sent in to the association's office as a record of a person quitting his job. The manufacturer's blue card (below) provides information for the association about a person who applies direct at the plant of the manufacturer.

formed. These men, who hire the help at the various plants, are taught the need of co-operation with management, foremen and association. They meet by themselves for instruction and education, and jointly with foremen for the purpose of general discussion of industrial conditions and problems.

Like all New England manufacturers, those at Hartford were confronted with a local housing problem. To overcome this problem they organized a $2,000,000 housing company. Its plans call for the construction of 1000 simple but comfortable workmen's homes, costing about $2,000 each. Although controlled by the Manufacturers' Association members, these homes can be purchased by employees under certain conditions as to resale, etc. The association members figure that each one of these houses purchased by an employee

means another available home somewhere else in the city for another workman and his family. The same scheme is carried out in Bristol. In conjunction with the housing innovation apprenticeship and vestibule schools have been started in various plants.

Married Women Utilized

So many details were involved in the housing proposition there was considerable delay in its launching. The officers of the association foreseeing this delay cast about for other ways in which the supply of available help could be augmented, until, at least, more normal labor conditions existed.

They realized that it was practically hopeless to expect to increase the number of male workers sufficiently to increase plant output materially. The one source of additional help lay in the female population of the county. A canvass showed that the available supply of female help had been pretty thoroughly combed over except for married women.

Lists of the girls who formerly worked in the various Hartford County plants and who had married and had homes were secured. A personal appeal was made to these married women, and where possible they were induced to give at least a part of their time to factory work. These women had been trained in manufacturing practice before they married and therefore needed no schooling. In a great many instances they have proved more efficient than they were before marriage, the duties and responsibilities of the home having made them so.

Some of them work but two hours per day in a plant, and others longer, a large percentage, five hours. Their hours of employment are left entirely to them, being governed by the time considered necessary by the worker for her home. One may go to work at 9 a. m. and quit at noon; another at 10 a. m. and quit at 2 p. m.; another at 11 a. m. and quit at 3; another at 1 p. m. and stop work at 3, 4 or 5 o'clock.

No woman is asked to stay after the time she considers necessary to return home and prepare the family evening meal. To overcome the disinclination of a woman with children to work, a children's dormitory with nurses is provided by those manufacturers who have profited most by this extra supply of labor. Here the mother leaves her child or children to be entertained with toys, etc., to be fed and rested as occasion or inclination demands.

The Royal Typewriter Co. has been one of the largest beneficiaries under this plan, having replaced on its payroll the names of 150 to 200 former girl employees. One hundred and fifty married women working five hours each day means 750 extra production hours for the manufacturer, or 3750 for each five-day week. Each Hartford County association member is convinced that 3750 extra production hours is a good investment on the time and money expended.

The features already mentioned are but a few in the Hartford County labor situation, which is well in hand. The nucleus of the situation there, however, is the simple yet effective system the Manufacturers' Association has of tabulating the record of its working population.

It will be recalled that 160 manufacturing establishments, employing 70,000 persons, are represented in the association. The association, however, has the working record of more than 200,000 in such complete form that Federal, State and municipal authorities often readily find desired information in these records, which, to gather elsewhere, would involve much time and considerable expense.

The Manufacturers' Association of Hartford County never passes on the question of a man's or woman's employment by a member employer. It simply presents to the employer or his employment department, when the question of employment is brought up through an application for work, the man's working record. The association leaves to the employer the decision of the applicant's merits or demerits. For it is not the purpose of the association to tell a manufacturer how to run his business. Its purpose lies in the effort to supply him with as complete a record of the worker's qualifications as is possible.

The system of records consists of five cards, as follows:

Application Card.—This card is used by the office of the association when a man or woman applies through the Hartford, New Britain and Bristol department offices. On this card is provided space for the applicant's trade, specialty, name, years of experience, address, where last employed, how long, date of leaving last place of employment and reason for leaving, age, nationality, whether married or single and the date of the application. This information is given on one side of the card. On the other side, space is provided for record of the association's efforts to find employment for the man.

Introduction Card.—When a man makes application for work at the association office he is given a number which is affixed to his application card. This number also is given on the introduction card, together with the applicant's name, the position he desires, and the name of the manufacturer to whom the applicant is introduced and the address. The firm returns this card to the Manufacturers' Association office, stating how the workman's application is treated, in a space provided.

Manufacturers' Blue Card.—This card contains all the information asked on the association's application card, together with the employee's clock number, and the time and date when he went to work. This card is for the purpose of securing the workman's record when application is not made to the association's office direct. The association office notifies the firm sending in the blue card whether the information contained thereon corresponds with that in its records. It is, in reality, a check-up on the association's records and eliminates the possibility of a workman becoming identified with a Hartford County industry without a record on file in the association's office.

Leaving Card.—On this card space is provided for the man's clock number, his name, address, nature of his work, date of leaving place of employment and reasons for so doing and his ability as a workman, together with the name of the firm with which he was employed. This card is mailed to the association office.

History Card.—This card is considerably larger than the other cards mentioned. It provides space for the man's number as contained on the application card, his name, address and, in fact, all the information contained on the application and blue cards. It is so arranged that a perfect record of the various places at which the man has been employed is maintained. Some workmen's histories necessitate two or more history cards, for the simple reason that the very nature of the

man causes him to shift positions or places of employment every so often.

This card system is really much simpler than it looks at first glance. It does not call for the employment of a large force of help to keep it in perfect working order. For instance, in the largest office, which is at Hartford, Mr. Kelly has one man assistant and two girl clerks to handle more than 200,000 history cards and the many application, introduction, blue and leaving cards. The operating forces at the New Britain and Bristol offices are proportionately small.

STEADILY IMPROVING

Transportation Conditions in Valleys Much Better—Coal Supply Still Short

YOUNGSTOWN, OHIO, Sept. 7.—Steady betterment in the transportation situation, with attendant benefits to the iron and steel trade, is the most conspicuous feature of the industry in the Mahoning and Shenango Valleys. Operating schedules are more regular and production is consequently higher. Republic Iron & Steel Co. has started its Hannah furnace, a detached stack in the Mahoning Valley, and now has all six of its furnaces in the Valley in blast. Only three Valley stacks are idle, two at the Ohio works of the Carnegie Steel Co. and the Niles furnace of the same interest. Hannah furnace had been down since April 9, and its resumption gives the Republic company about 300 additional tons of iron daily at a time when it is needed owing to reduction in iron stocks. In the two Valleys, about 300,000 tons of steel products are held up, awaiting shipment, though this is about 100,000 tons below the peak accumulation.

Except for those departments requiring continuous operation, schedules of all the producers in the district, aside from the Carnegie Steel Co., were suspended Sept. 6 to permit employees to share in Field Day observances or in Labor Day celebrations. On Tuesday, normal operations were resumed by all producers. Two bar mills of the Republic Iron & Steel Co. resumed after being idle for a week because of an accident to a billet mill. Owing to improved gas coal supply, the Trumbull Steel Co. placed all seven open-hearth furnaces in commission this week.

Trumbull Steel Co. Protests

The coal supply is still short and the difficulties of makers in securing an adequate tonnage are reflected in a protest of the Trumbull Steel Co. to the Interstate Commerce Commission. The company complains that it has been obliged to ship 35 per cent of the output of its mines in Pennsylvania, supplying gas coal, to the lake pool, whereas the entire production is needed at its plant. To meet the shortage, the company has been compelled to purchase coal on the market at a much higher price than is obtained from the sale of its mined product for lake shipment. As a consequence, its steel production has been seriously hampered. Other district interests, including the Youngstown Sheet & Tube Co., Brier Hill Steel Co. and the Republic company have had to contend with the same condition.

The most serious aspect of the situation is that the companies have made little progress in stocking coal for winter consumption. Upon termination of the lake priority ruling, it is expected fuel shipments to the Valleys will show an immediate improvement and that large consumers may make some provision for winter requirements.

Break in Prices Expected

Steel manufacturers believe a break in coal and coke prices will come within a few weeks and that new levels will be established substantially below the peak quotations. Spot steam coal is now around $9 a ton as compared with a peak of $13.50, while spot coke prices at $17 are down relatively less than coal prices. Furnace coke for the last quarter is being offered at $12 and buying interests still show a disposition to hold off. With lower coal and coke prices, a slackening in pig iron prices may be expected to materialize as costs decline.

August production and shipments were satisfactory and registered a marked improvement over June and July. September will show further gains, from present indications. In August, the Republic Iron & Steel Co. shipped 24,000 tons of pipe, for instance, as compared with a normal monthly shipment of 20,000 tons. A large part of this was moved by truck. In certain lines of production, motor truck movement continues to make capacity production possible. One district plant shipped 15,000 tons last month in this manner.

Special Order Helps

The special Interstate Commerce Commission order allocating 17 cars daily to the Sheet & Tube and Republic companies for movement of pipe is materially expediting transit of tubular goods to the southwest. Practically no surplus pipe tonnage is available for the remainder of the year.

The sheet market continues active, with all makers except two of the smaller plants sold until 1921. The companies in question have been conservative in booking orders, otherwise their schedules would be fully occupied. In the semi-finished market, a small steel bar tonnage, cancelled by automobile makers, was snapped up at prices ranging upward to 5c. Sheet bar sales at market prices, clearing out the available tonnage of certain makers for the remainder of the year, are reported, thus reflecting the strong demand for sheets confronting this division of the industry.

New Norwegian Electric Ore Smelting Project

WASHINGTON, Sept. 7.—Norway is planning government support for an iron and steel industry in that country, according to a report made to the Department of Commerce by Consul General Letcher at Christiania.

Some years ago, says Mr. Letcher, two brothers by name of Stlig, who were inventors employed at the Trollhätten power plant in Sweden, claimed to have invented a process for the electrical smelting of iron ore whereby coke would be used instead of charcoal, and in which only about 350 kg. of coke would be required for the manufacture of one metric ton of pig iron. The Sima company of Christiania became interested in the proposition and contracted with the inventors of the process to continue their experiments for the further perfection of their process. Within the past year the company has succeeded in interesting the Norwegian Government in making a subvention of 500,000 kr. to assist in the erection of furnaces for the practical application of the Stlig electric process for smelting iron ore. The terms of the subvention require that 700,000 kr. be raised independently of the government. The process mentioned has been very carefully examined by a committee of experts appointed by the Norsk Investment Co., which is handling the financial side of the enterprise; the committee reported very favorably. The Sima company proposed to build immediately a large plant including a rolling mill but the committee declined to recommend so ambitious a project before the process had been thoroughly tested. The government has also provided for a smelting subvention enterprise at Narvik, this being known as the Narvik Staal og Valseverk. It is understood that the process of smelting iron proposed by this company is identical with the Stlig process. The government has made a subvention of 16,000,000 kr. to the Narvik project.

The Timken Roller Bearing Co., Canton, Ohio, resumed operations Sept. 7, after a shutdown for inventory. The company is now operating its plant with a day shift, working 55 hours per week with the same wage rates that it has been paying for day work. The company in an announcement to its employees stated that because of a reduction in orders for bearings it had found it necessary to discontinue its night shift and it made up a new force composed of the most efficient men from both its day and night shifts.

The Basset Direct Steel Process

A new company has been formed in France under the title of Société Française des Aciéries Basset, with a share capital of 60,000,000 francs (£2,400,000 at par), to work the patent rights secured by M. L. Basset, which, according to the report of the Commissaire aux Apports submitted to the recent general meeting of the shareholders, includes a direct process for making iron and steel, according to a translation from the Paris *Information* in the London *Iron and Coal Trades Review*.

The Basset process—concludes the Commissary's report—has passed the stage of patent specifications, as it has already been tried on a commercial scale, though small, and thus the direct steel process so much sought for has finally been realized. There are three sets of apparatus required in the cycle of modern steel-making operations; two of these, the blast furnace and converter, are replaced in the Basset process by an apparatus which is extremely simple in construction, and inexpensive, with low consumption of raw materials and cheap working.

The board of directors includes M. Basset himself, and a namesake; three ironmasters; a director of the Belgian Ougrée-Marihaye Co.; the president of the Société Française des Mines de Fer; M. Jarry, the administrateur délégué of the Tréfileries du Havre, and others.

The preliminary trials were carried out at Mantes, in the old Lavocat Works, with a furnace specially adapted for the purpose. It is reported that the daily output was 25 tons. A plant comprising six furnaces of 250 tons each is said to be in course of construction at Longwy, and will be ready to start producing within six months. Another plant with a daily output capacity of 2000 tons is said to be building in Normandy, and will begin to produce in about a year's time.

Phantom Guard for Grinding Machines

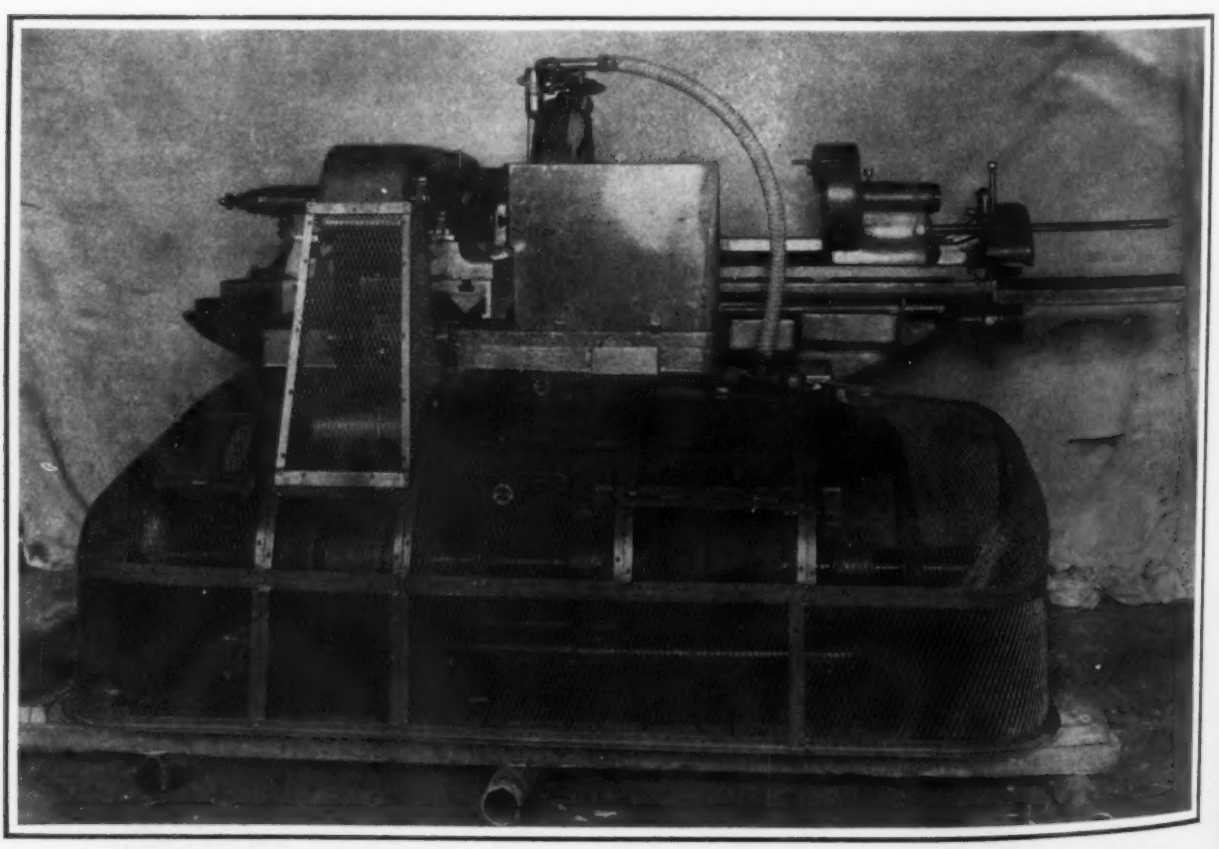
The Modern Tool Co., Erie, Pa., is now supplying its grinding machines equipped with phantom guards in place of the cast-iron guards formerly used. The phantom guard is a combination of expanded or perforated metal, riveted to an angle-iron frame. It combines lightness with strength and gives practically complete visibility to all moving parts.

The new guard completely incloses all gears, pulleys, and belts, and follows the lines of the machine; corners instead of being square are rounded and do not project into the passage way. Hinged portions and hand holes provide for lubrication and minor adjustments. The guard can be placed in position or removed without a wrench or screw driver, as it is supplied as a unit.

A Chart of Rolling Mill Practice

A remarkable chart, entitled "American Rolling Mill Practice," has been worked out and copyrighted by Charles E. Lehr, chief engineer, and W. J. Phillips, chief draftsman, of the Bethlehem Steel Co. The chart, beginning with two sizes of ingots, traces the reduction of the ingot to billets and thence the further rolling to finished products. The feature of the chart, which covers 32 different rolled shapes, is that besides indicating the shape of each succeeding cross section of the rolled product, the area and therefore the reduction from the preceding pass and the elongation are enumerated. These sectional diagrams naturally indicate what are the profiles of the rolls. The finished sections include a rim section, window sash, turbine blade, 100-lb. rail, sheet piling and various common structural and bar sections. Incidental are some illustrations showing the main apparatus, such as the equipment used in a rolling mill and typical layouts of the general types of rolling mill. The chart is 23¼ x 41¼ in., and may be obtained at $2 from Mr. Phillips.

The Seattle Chain Co. is doubling the capacity of its plant at Seattle, Wash. L. D. Round, sole owner of D. Round & Sons, block chain makers of Cleveland, also a large owner in the Cleveland Chain & Mfg. Co. and in the Krein Chain Co., Wapakoneta, Ohio, recently bought a controlling interest in the Seattle Chain Co. and is now its president. H. E. Woolley is vice-president and general manager, and L. D. Cull, is secretary and treasurer. The company is doing business with Canada, Japan, China and the Philippines.



Handholes and Hinged Portions of the Phantom Guard Provide for Lubrication and Minor Adjustments.

WILL BUILD MORE SHIPS

Ten Tankers for the Standard Oil Co. Under Tax Exemption Law

WASHINGTON, Sept. 7.—Although the United States Shipping Board received a considerable number of inquiries concerning vessels offered for sale, the formal opening of bids Sept. 1 found no proposals either for the steel or wooden ships offered by the board. Further efforts probably will be made to sell the ships, although there seems little present prospect that the board will reduce its minimum prices.

The board has decided that it cannot sell chartered ships to the companies chartering them, even under sales contracts, without previous competitive bidding. As a result, it is likely that bids will be asked for some of the ships which have been operated under such charters.

Plans have been approved by the board for 10 tankers to be constructed under the law which provides special tax exemptions for American ships. These vessels are to be built for the Standard Transportation Co., a subsidiary of the Standard Oil Co.

Five of the Standard company's ships—four of 12,620 deadweight tons and one of 10,100 tons—are to be built at the Sparrows Point plant of the Bethlehem Shipbuilding Co., and one of 10,100 tons at the latter's Union plant at San Francisco. Four of these ships of 12,620 tons each are to be constructed by the New York Shipbuilding Corporation at Camden, N. J.

Besides these, the board approved the construction of a five-masted schooner by the Newcastle Shipbuilding Co. for the Boston Maritime Corporation of Boston and Richard Diebold of Newcastle, Me.

According to the reports of the Bureau of Navigation, steel shipbuilding in the United States is still on the increase. On Aug. 1, 1920, private American shipyards were building or under contract to build for private shipowners 389 steel vessels of 1,335,721 gross tons, compared with 334 vessels of 1,306,956 gross tons on July 1, 1920. These figures do not include Government shipbuilding or that contracted for by the Shipping Board.

COMMERCE REGULATION

Important Point Raised as to Powers of Commission and Congress

WASHINGTON, Sept. 7.—Briefs are to be filed this week in the controversy which has arisen over the right of the Interstate Commerce Commission to issue embargoes and priority orders such as those which are now in operation to force shipments of coal to New England and the Northwest.

Although the issue arose in the complaint made against those orders by the cities of Cleveland and Akron, Ohio, the controversy has grown far beyond that point. It now involves the constitutionality of the acts of the commission and promises to be one of the most important legal fights of years over the exercise of the congressional power to regulate interstate commerce.

The brief attacking the power of the commission is to be filed by the American Wholesale Coal Association, which represents the large dealers. Advance reports of this brief declare it to be the most vigorous kind of an attack upon the commission and its orders. The brief to defend the commission is to be filed by the National Coal Association, representing the mine owners, who consented to the embargo and priority orders issued by the commission.

The proceeding bids fair to have a most important effect upon the coal situation for the coming winter. If the commission should be found to have no power to issue these priority orders under the new transportation act, it would remove every possibility of governmental control to avert a coal shortage or to alleviate it. With the railroads in private hands, no other power could intervene to equalize coal distribution or to favor one section of the country against another, or to aid even public utilities in maintaining their coal supplies.

The figures compiled by the Geological Survey declare that the bituminous output for the week ending Aug. 28 revealed a partial recovery from the slump of the preceding week, the production rising to 11,374,000 net tons, an increase of 326,000 tons or 3 per cent above the figures for the preceding week.

Beehive coke production in the week ending Aug. 28 showed a slight decline, totalling 412,000 net tons against 399,000 tons in the preceding week. Production declined in Pennsylvania and Alabama but increased in Virginia and West Viginia. In the Connellsville region, the output was 211,000 tons against 219,000 in the week before. The present rate of output is practically the same as that for 1919, although the cumulative tonnage for the year is now 14,048,000 tons against 12,798,000 in the same period a year ago.

Standard Parts Co., Cleveland, Placed in Hands of Receivers

The Standard Parts Co., Cleveland, was placed in the hands of receivers Sept. 1, following the issuing of a temporary injunction in the Federal court against the carrying out of a plan of financing that was asked for by a minority stockholder and the filing of an application for receivership by the Erie Malleable Iron Co., Erie, Pa. The receivers who were named by Federal Judge D. C. Westenhaver are J. O. Eaton, president the Standard Parts Co., and Frank A. Scott, vice-president Warner & Swasey Co., Cleveland.

When the receivership case came up the previous day, the court appointed a committee of nine to recommend a course of procedure and this committee recommended the appointment of receivers. The court stated that the report of the committee coincided with his own views in the matter. The judge further stated that the company is not insolvent, that its debts are $9,500,000, while its current assets are between $10,000,000 and $11,000,000 and fixed assets in excess of $10,000,000, that the company's affairs ought to be easily handled with the co-operation of creditors and stockholders, and that preservation of assets depended upon continuous operation of the company's plants. The court believed that the receivership was an indispensable step toward stabilizing the situation and preserving the corporation from disintegration and for the working out of the reorganizing and refinancing of the company, and that with proper co-operation the receivership would be only temporary. Three committees were named, one representing the creditors, another the preferred stockholders and the third the common stockholders, to represent the various interests, and these committees later appointed a reorganization committee, of which Cyrus Easton is chairman.

The former Railway Storekeepers' Association, with headquarters at Collinwood, Ohio, has been amalgamated with the American Railroad Association as Section VI, Purchases and Stores, and the committee on scrap classification is working on a revision. A report was presented at the 1920 annual meeting, which was held at Atlantic City during June, and the committee expects to have the report completed in time to be included in the annual proceedings, which will go to press within a short time, as announced by W. J. Farrell, assistant secretary.

The Brier Hill Steel Co., Youngstown, Ohio, has purchased the lake freighter, the H. H. Porter, one of the four vessels built by the American Shipbuilding Co. this season on its own account. This vessel, which will be placed in commission this week, will be operated by a separate corporation to be known as the Brier Hill Steamship Co. and will be used for carrying ore for the Brier Hill Steel Co.

LARGE GAIN IN PIG IRON

August Output 80,000 Tons Heavier Than in July—Rate Per Day Higher

Net Gain of 18 Furnaces—Record for the Year in Manganese-Iron Alloys

The August production of pig iron is a fair measure of the extent to which the transportation and labor conditions of the country improved during that month as compared with previous months. The increase in output over recent months was sufficient to bring the total second only to that in March.

The production of coke and anthracite blast furnaces in August, a 31-day month, amounted to 3,147,402 gross tons or an average of 101,529 tons per day as compared with 3,067,043 tons or 98,937 tons per day in July, a 31-day month, and with 3,043,540 tons or 101,451 tons per day in June, a 30-day month. The August production ranks second to that of March which has been a record thus far this year at 3,375,907 tons. There was a net gain of 18 furnaces, the total in blast on Sept. 1 having been 311 as compared with 293 Aug. 1. There were 23 furnaces blown in and 5 blown out or banked.

Another record for the year was made in the production of manganese alloys, the August total having been 36,985 tons. Of this total ferromanganese constituted 28,652 tons and spiegeleisen 8333 tons. The ferromanganese output was next to the largest for the year, the July total having been 29,864 tons.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from August, 1919, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
August, 1919	68,018	20,478	88,496
September	60,954	21,978	82,932
October	41,796	18,319	60,115
November	57,589	22,156	79,745
December	61,815	23,129	84,944
January, 1920	72,015	25,249	97,264
February	75,230	27,490	102,720
March	80,021	28,879	108,900
April	65,168	26,159	91,327
May	68,668	27,644	96,312
June	73,659	27,792	101,451
July	71,954	26,983	98,937
August	72,740	28,789	101,529

The figures for daily average production, beginning with January, 1914, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1914—Gross Tons

	1914	1915	1916	1917	1918	1919	1920
Jan.	60,808	51,659	102,746	101,643	77,799	106,525	97,264
Feb.	67,453	59,813	106,456	94,473	82,835	105,006	102,720
Mar.	75,738	66,575	107,667	104,882	103,648	99,685	108,900
Apr.	75,655	70,550	107,592	111,165	109,607	82,607	91,327
May	67,506	73,015	108,422	110,238	111,175	68,002	96,312
June	63,916	79,361	107,053	109,002	110,793	70,495	101,451
July	63,150	82,691	104,017	107,820	110,354	78,340	98,931
Aug.	64,363	89,666	103,346	104,772	109,341	88,496	101,529
Sept.	62,753	95,085	106,745	104,465	113,942	82,932	.....
Oct.	57,361	100,822	113,189	106,550	112,482	60,115	.....
Nov.	50,611	101,244	110,394	106,859	111,802	79,745	.....
Dec.	48,896	103,333	102,537	92,997	110,762	84,944	.....

The furnaces blown in include one Lackawanna furnace in New York and the Musconetcong furnace in New Jersey; the Crumwold furnace and one furnace of the Thomas Iron Co. in the Lehigh Valley; one Warwick furnace in the Schuylkill Valley, New Castle No. 2 furnace of the Carnegie Steel Co., and one Shenango furnace in the Shenango Valley; Scottdale furnace in Western Pennsylvania, Graham and Covington furnaces in Virginia, two Mingo furnaces of the Carnegie Steel Co., and the Belmont furnace of the Wheeling Steel & Iron Co. in the Wheeling district; No. 2 River furnace in Northern Ohio, the Belfont furnace and the Portsmouth furnace in Southern Ohio, one Joliet furnace and two South Chicago furnaces in Illinois and two Gary furnaces in Indiana; one North Birmingham furnace of the Sloss-Sheffield Steel & Iron Co., and No. 2 furnace of the Tennessee Coal, Iron and Railroad Co., in Alabama.

Among the furnaces blown out or banked are the Colonial furnace in Western Pennsylvania; Allegheny furnace of the Allegheny Ore & Iron Co. and Big Stone Gap furnace in Virginia; No. 2 furnace of the National Tube Co. in Northern Ohio and No. 1 furnace of the Tennessee Coal, Iron & Railroad furnace in Alabama.

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for August, and the three months preceding:

Pig Iron Production by Districts—Gross Tons

	Aug. (31 days)	July (31 days)	June (30 days)	May (31 days)
New York	223,091	212,392	221,067	220,829
New Jersey	8,020	3,764	7,494	9,366
Lehigh Valley	96,310	87,622	80,680	89,699
Schuylkill Valley	83,143	76,614	82,232	97,013
Lower Susquehanna and Lebanon Valleys	67,849	57,863	63,810	68,340
Pittsburgh district	655,191	637,773	664,345	652,940
Shenango Valley	108,949	97,708	93,975	62,297
Western Penna.	183,125	177,866	165,907	184,541
Maryland, Virginia and Kentucky	102,785	99,850	103,219	114,765
Wheeling district	123,047	108,304	116,967	119,015
Mahoning Valley	304,482	297,462	267,816	177,685
Central and Northern Ohio	311,310	304,149	288,789	287,544
Southern Ohio	61,877	55,293	65,547	74,078
Chicago district	462,550	488,790	472,609	477,878
Mich., Minn., Mo., Wis., Colo., and Wash.	118,127	119,629	116,552	111,760
Alabama	212,946	218,227	209,087	212,124
Tennessee	24,600	23,737	23,444	25,817
Total	3,147,402	3,067,043	3,043,540	2,985,682

Capacities in Blast Sept. 1

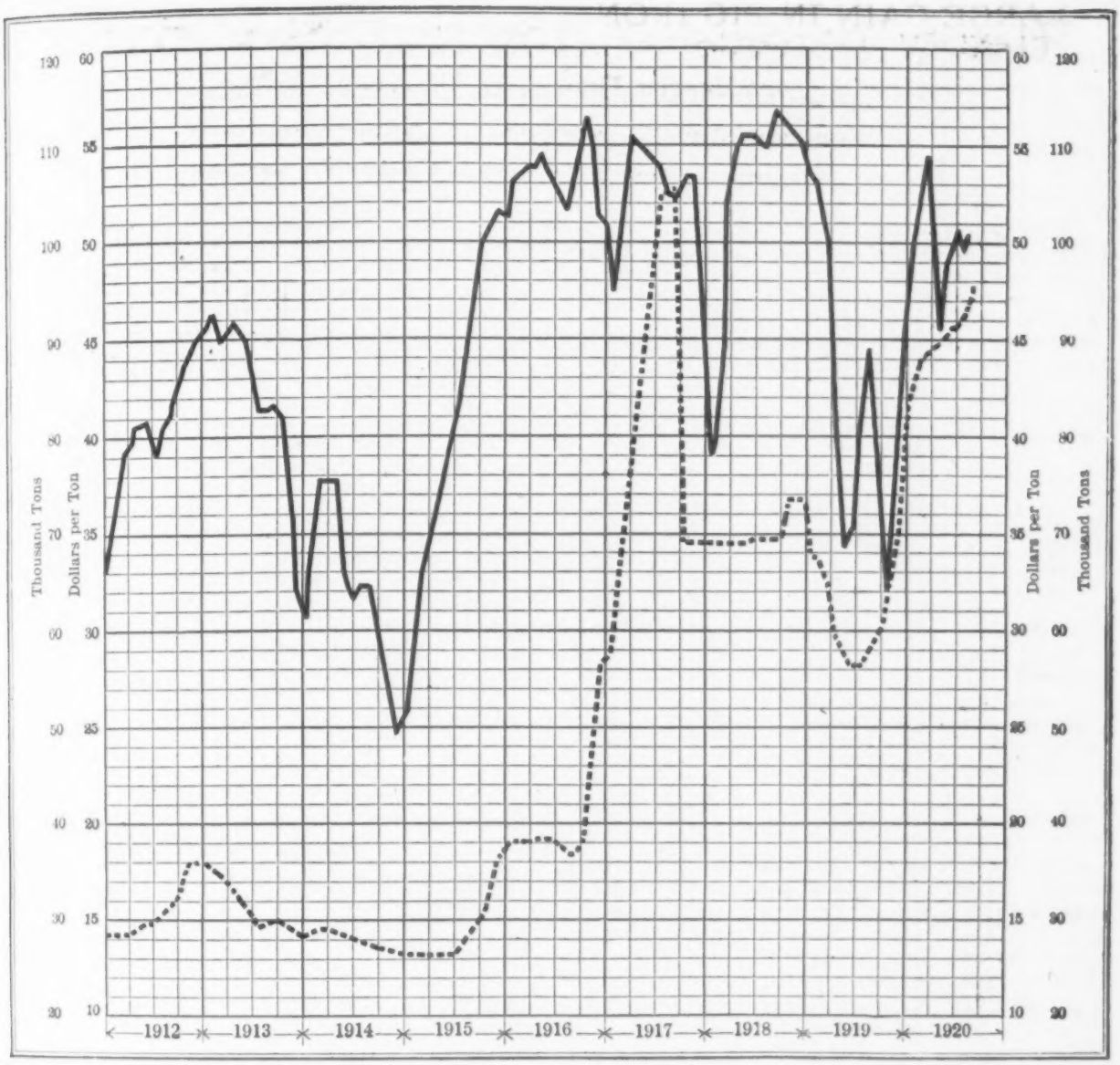
The following table shows the number of furnaces in blast Sept. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast Aug. 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces.	Total stacks	Sept. 1: In blast	Sept. 1: Capacity per day	Aug. 1: In blast	Aug. 1: Capacity per day
New York:					
Buffalo	32	20	6,915	19	6,660
Other New York	4	3	600	3	570
New Jersey	4	2	250	1	125
Pennsylvania:					
Lehigh Valley	18	14	3,015	12	2,660
Spiegel	2	2	180	2	180
Schuylkill Valley	11	10	2,860	9	2,210
Lower Susquehanna	8	4	1,160	4	1,070
Ferro	2	2	110	2	65
Lebanon Valley	9	4	700	4	565
Ferro	1	3	180	3	205
Pittsburgh District	53	45	20,615	45	18,285
Ferro and Spiegel	5	3	520	3	505
Shenango Valley	19	12	3,950	10	3,085
Western Penn.	27	18	5,935	18	5,660
Ferro and Spiegel	1	1	65	1	50
Maryland	6	5	1,430	5	1,480
Wheeling District	15	11	4,075	8	2,275
Ohio:					
Mahoning Valley	27	22	9,820	22	9,600
Central & North.	26	23	10,280	23	9,810
Southern	16	14	2,245	12	1,780
Illinois and Ind.	40	30	16,000	25	13,740
Ferro	1	1	70	1	75
Mich., Wis. and Minn.	14	8	2,645	8	2,670
Col., Mo. and Wash.	8	4	1,165	4	1,155
The South:					
Virginia	17	8	1,035	98	995
Ferro	1	1	55	1	60
Kentucky	7	5	785	5	730
Alabama	45	28	6,815	27	7,025
Tennessee	17	8	790	8	735
Total	437	311	104,265	293	93,965

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1910 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnace at Chicago, and No. 2 X at Philadelphia. They are based on the weekly quotation of THE IRON AGE.



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1916—Gross Tons

	1916	1917	1918	1919	1920
Jan.	3,185,121	3,150,938	2,411,768	3,302,260	3,015,181
Feb.	3,087,212	2,645,247	2,319,299	2,940,168	2,978,879
Mar.	3,337,691	3,251,352	3,213,091	3,090,243	3,375,907
Apr.	3,227,768	3,334,960	3,288,211	2,478,218	2,739,797
May	3,361,073	3,417,340	3,446,412	2,108,056	2,985,682
June	3,211,588	3,270,055	3,323,791	2,114,863	3,043,540
July	3,224,513	3,342,438	3,420,988	2,428,541	3,067,043
Aug.	3,203,713	3,247,947	3,389,585	2,743,388	3,147,402
8 mos.	25,838,679	25,660,277	24,813,145	21,205,737	24,353,431
Sept.	3,202,366	3,133,954	3,418,270	2,487,965	.....
Oct.	3,508,849	3,303,038	3,486,941	1,863,558	.....
Nov.	3,311,811	3,205,794	3,354,074	2,392,350	.....
Dec.	3,178,651	2,882,918	3,433,617	2,633,268	.....
Total, 12 mos.*	39,039,356	38,185,981	38,506,047	30,582,878	.....

*These totals do not include charcoal pig iron. The 1918 production of this iron was 347,224 tons.

Production of Steel Companies

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total production			Spiegeleisen and ferromanganese		
	1918	1919	1920	1918	1919	1920
Jan.	2,256,208	2,430,022	2,232,455	30,695	32,787	23,957
Feb.	1,620,254	2,209,470	2,181,679	26,114	28,105	28,038
Mar.	2,319,419	2,277,507	2,480,668	39,122	26,644	35,275
Apr.	2,411,488	1,838,677	1,968,542	35,511	17,308	27,628
May	2,513,577	1,586,805	2,128,720	54,633	14,604	33,407
June	2,407,166	1,655,944	2,209,770	44,844	14,254	34,751
July	2,456,693	1,906,604	2,230,567	51,762	14,805	36,789
Aug.	2,509,357	2,108,566	2,254,943	54,009	17,419	36,985
Sept.	2,567,381	1,828,613	.....	66,275	20,631	.....
Oct.	2,594,277	1,295,690	.....	70,379	20,238	.....
Nov.	2,501,867	1,727,656	.....	59,638	19,964	.....
Dec.	2,324,794	1,916,249	.....	49,435	15,718	.....

Blast Furnace Notes

No. 3 Monongahela furnace of the National Tube Co. was idle during August undergoing repairs and had not blown in Sept. 1.

No. 2 furnace of the National Tube Co. in northern Ohio was idle 11 days during August for rebuilding.

The after effects of the Illinois coal strike in the Chicago district are shown by the fact that No. 1 Joliet furnace blew in Aug. 14, that Nos. 2, 7 and 10 South Chicago furnaces blew in on Aug. 9, 5 and 14 respectively, that No 9 furnace was out the entire month and that at Gary, Ind., furnaces Nos. 1 and 3 blew in on Aug. 7 and No. 7 on Aug. 4, with No. 8 out after Aug. 7.

C furnace of the Colorado Fuel & Iron Co. has been dismantled, leaving the total number of stacks five.

During August, 11 blast furnaces in the United States produced 28,652 tons of ferromanganese and three furnaces produced 8333 tons of spiegeleisen.

All previous records for its production of pig iron were broken at the blast furnaces of the American Rolling Mill Co., Columbus, Ohio, during the month of August. The production figures went slightly over the 20,000-ton mark, which is several hundred tons above the best previous figure by this company.

Heavy Increase of Iron and Steel Exports

Japan Continues an Important Buyer of American Products—Heavy Importing of Scrap—Movement of Machine Tools to Foreign Countries Declines

WASHINGTON, Sept. 6.—July exports of iron and steel showed a 50 per cent increase over July, 1919, figures and approximately a 10 per cent increase over the figures for June, 1920. The increase covers practically the entire line of iron and steel exports and is represented both in the tonnage figures and in the valuations. Statistics compiled by the Department of Commerce show that exports of iron and steel in July, 1920, aggregated $92,147,844, against $88,844,831 in June, 1920. For the seven months period ending with July, 1920, these exports aggregated $604,865,366, as against $608,836,919 in the same period last year. This slump in the seven months total is largely due to the fact that June, 1920, fell more than $30,000,000 below the exports for June, 1919.

Exports, January, 1919, to July, 1920

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
January, 1919	360,456	35,793	11,594
February	234,793	20,178	10,407
March	344,506	22,054	8,176
April	408,204	16,300	11,488
May	447,050	32,233	20,771
June	544,580	39,540	46,016
July	287,823	38,373	21,318
August	396,743	36,071	36,162
September	363,505	18,991	37,513
October	302,456	14,108	20,713
November	295,045	21,429	13,211
December	254,676	14,612	21,538
Total	4,239,837	309,682	258,907
January, 1920	333,601	18,468	19,937
February	308,185	15,739	22,693
March	417,216	22,740	30,444
April	395,120	14,608	19,032
May	420,359	13,032	16,370
June	402,707	17,075	29,811
July	489,223	29,647	17,243

Exports of Iron and Steel

	July		Seven Months	
	Gross Tons 1919	Gross Tons 1920	Gross Tons 1919	Gross Tons 1920
Ferromanganese	555	417	1,697	934
Ferrosilicon	3,399	97	4,754	306
All other pig iron	38,383	29,133	209,599	128,995
Scrap	2,949	24,906	7,875	84,021
Bar iron	2,065	33,729	45,103	22,388
Wire rods	6,112	12,258	77,307	77,588
Steel bars	48,109	55,933	327,152	363,288
Billets, ingots, blooms, n.e.s.	21,318	17,243	129,263	155,530
Bolts and nuts	2,788	2,639	26,638	22,290
Hoops and bands	1,212	4,733	34,386	31,906
Horseshoes	341	198	2,141	1,141
Cut nails	196	354	2,250	1,296
Wire nails	5,202	8,184	61,124	43,959
All other nails, including tacks	497	878	12,102	6,534
Cast-iron pipes and fittings	3,402	3,851	23,403	30,942
Wrought-iron pipes and fittings	14,206	28,075	149,774	147,675
Radiators and cast-iron house-heating boilers	158	486	1,868	4,285
Railroad spikes	1,698	1,270	16,909	9,794
Steel rails	32,707	51,869	413,230	333,803
Galvanized iron sheets and plates	5,949	10,642	61,465	63,834
All other iron sheets and plates	2,070	1,802	24,479	17,659
Steel plates	31,066	58,360	450,099	494,505
Steel sheets	11,616	15,220	114,840	92,261
Ship and tank plates punched and shaped	718	5,522	6,572	25,369
Structural iron and steel	19,201	36,054	240,551	236,695
Tin and terne plates	9,713	17,553	132,244	139,995
Barb wire	7,626	10,439	51,914	72,151
All other wire	14,577	17,358	115,229	92,256
Total	287,823	489,223	2,743,768	2,701,400

The tonnage figures of iron and steel exports for July, 1920, showed an outgo of 449,223 tons, against 287,823 tons in July, 1919, and 402,707 tons in June, 1920. Among the important items in this list is exports of steel rails, which totaled 51,869 tons in July, 1920, against 32,707 tons in July, 1919, and 49,620 tons in June, 1920. The valuation of the July, 1920, rail exports was $3,329,530, against $1,869,472 in July, 1919. The two biggest customers for rails were Japan, which purchased 13,632 tons in July, 1920, against 12,770 tons in July, 1919; and Cuba, which received 11,344 tons in July, 1920, against only 3077 in July, 1919. The exports of structural iron and steel totaled 36,054 tons in July, 1920, against 19,201 in July, 1919. Here, again, Japan was the largest purchaser, taking 13,540 tons, against 418 tons in July, 1919; while Canada received 10,524 tons in July, 1920, and 5302 tons in July, 1919. Exports of steel plates totaled 58,360 tons in July, 1920, almost double the July, 1919, total of 31,066 tons, but slightly below the June, 1920, figure of 61,555 tons. Japan was the second largest purchaser of the July, 1920, total, taking 17,600 tons, against 7821 tons of a year ago. The outgo of tin and terne plate for July, 1920, was 17,553 tons, almost double the 9713 tons in July, 1919, and again just below the 18,604 tons in June, 1920. Canada was the chief purchaser, taking 6447 tons, against 1764 tons a year ago. Japan was second, buying 2670 tons, against 607 tons a year ago. Wrought iron pipes and fittings showed an export total of 28,075 tons in July, 1920, against 14,206 in July, 1919, and 17,654 in June, 1920. Steel bars were exported to a total of 55,933 tons in July, 1920, against 41,109 in July, 1919, and 53,559 in June, 1920.

Imports of Iron and Steel

	July		Seven Months	
	Gross Tons 1919	Gross Tons 1920	Gross Tons 1919	Gross Tons 1920
Ferromanganese	1,081	2,448	16,393	23,711
Ferrosilicon	1,260	1,265	3,021	9,436
All other pig	1,608	7,335	11,594	85,387
Scrap (including tin)	20,787	7,953	78,993	85,672
Bar iron	123	564	887	2,468
Structural iron and steel	124	192	693	841
Steel billets without alloys	25	1,313	3,944	17,416
All other steel billets	242	481	1,403	2,803
Steel rails	3,065	9,550	13,671	903
Sheets and plates	157	79	658	903
Tin and terne plates	34	17	104	222
Wire rods	15	666	99	1,971
Total	28,521	31,863	131,460	231,733
Manganese ore and oxide of	15,585	18,447	241,570	234,989

The valuation of the exports showed a considerable increase in almost every commodity in the comparison of the July figures of 1920 and 1919. Only two items showed a real decrease—pig iron dropping approximately $200,000 and billets $600,000; but the figures for scrap were increased by approximately $666,000 and bars by $1,400,000; hoops and bands by $500,000; nails by $600,000; pipes and fittings by $2,400,000; rails by $1,400,000; sheets and plates by $4,000,000; structural iron and steel, $1,300,000; tin plates, $1,700,000; wire and manufactures of wire by $1,000,000.

But the big increase came in the exports of the various lines of machinery. Here the July, 1920, figures showed an increase of more than $13,000,000 over the July, 1919, total. In July, 1920, these exports aggregated $37,303,838, against $24,004,442 in July, 1919, and $36,501,051 in June, 1920. For the seven months ending July, 1920, the machinery exports aggregated $258,888,297, against $226,609,860 in the same period last year. The largest item in the machinery increases is credited to engines of all kinds. Here the total for July, 1920, was $12,729,454, against $5,329,360 in July, 1919, and $11,466,686 in June, 1920.

Exports of Machinery

	July		Seven Months	
	1919	1920	1919	1920
Adding machines	$226,569	$455,912	$2,548,234	$3,239,464
Air compressing machinery	196,789	375,391	2,326,592	3,115,011
Brewers' machinery	17,917	14,277	136,763	253,561
Cash registers	265,489	370,792	2,084,354	3,661,062
Parts of	29,965	52,033	157,206	287,157
Concrete mixers	20,700	45,326	112,222	407,166
Cotton gins	14,221	25,747	247,419	265,465
Cream separators	57,882	92,474	663,997	737,836
Elevators and elevator machinery	631,559	81,740	2,076,146	901,063
Electric locomotives	2,223	6,286	210,243	842,845
Gas engines, stationary	23,439	47,926	342,697	477,751
Gasoline engines	1,911,664	3,299,269	20,293,261	22,705,412
Kerosene engines	422,266	774,507	5,117,792	6,189,173
Steam engines	531,973	5,150,592	17,405,996	34,480,330
All other engines	285,395	604,906	2,366,797	2,666,996
Boilers	476,089	533,331	3,362,823	3,417,011
Boiler tubes	386,363	497,137	6,051,843	2,705,205
All other parts of engines	1,289,988	1,815,500	16,767,894	12,184,415
Excavating machinery	21,091	83,000	586,395	924,398
Milling machinery, flour, grist	20,943	97,506	1,615,051	955,760
Laundry machinery, power	60,985	65,421	393,686	706,187
All other	28,523	96,785	245,870	434,313
Lawn mowers	20,792	35,513	316,514	229,255
Lathes	840,191	542,175	6,595,986	5,076,612
Other machine tools	1,090,382	915,074	7,961,533	8,246,346
Sharpening and grinding machines	453,545	396,246	3,712,687	2,533,306
All other metal working machinery	2,056,701	1,823,097	19,485,780	11,656,144
Meters, gas and water	63,766	54,205	467,445	437,407
Mining machinery, oil well	299,674	458,704	2,100,818	2,840,995
All other	653,286	676,331	6,272,603	5,273,368
Paper mill machinery	160,582	167,267	2,495,143	1,228,959
Printing presses	208,528	742,699	1,994,229	4,985,091
Pumps and pumping machinery	671,047	936,560	5,200,913	7,016,908
Refrigerating and ice-making machinery	108,559	526,663	1,415,534	2,115,317
Road-making machinery	57,083	98,130	524,582	784,717
Sewing machines	708,597	1,268,094	7,573,603	9,976,041
Shoe machinery	239,249	188,435	1,557,800	1,296,015
Sugar-mill machinery	1,432,422	1,406,722	5,859,031	7,498,909
Textile machinery	1,005,320	1,194,880	8,316,907	11,408,213
Typesetting machines	148,097	363,976	2,729,138	2,888,420
Typewriting machines	1,517,358	1,804,733	10,032,059	15,942,219
Windmills	55,824	167,861	605,938	1,046,190
Wood-working machinery, saw mill	61,121	64,456	882,378	667,303
All other	153,826	272,355	1,353,444	2,188,095
All other machinery and parts of	5,076,229	8,103,799	43,412,514	52,995,246
Total	$24,004,442	$37,303,838	$226,609,860	$258,888,297

The exports of the various kinds of metal working machinery showed a slump in July 1920, dropping to $3,676,592, against $4,440,819 in July, 1919, and $3,504,723 in June, 1920. For the first time in a long period, France led in these exports, receiving $978,634 worth in the various types of metal working machinery, against $1,130,486 in July, 1919. The United Kingdom received $937,077, against $1,495,432 a year ago; Canada was third with $548,653, against $181,736 in July, 1919; Japan bought $300,899 in July, 1920, against $86,437 in July, 1919.

The import figures for iron and steel continue to pile up increasing totals, the July, 1920, totals aggregating 31,863 tons, against 28,521 tons in July, 1919, and 40,554 tons in June, 1920. For the seven months ending July, 1920, the total was 231,733 tons, against 131,460 for the same period a year ago.

These figures, however, do not do justice to the importance of these increases, for the increase is due to enormous influx of the higher forms of fabricated steel, while the cheaper item of scrap shows a heavy setback. The valuation figures are far more in line with the significance of these importations. They show that the July, 1920, importations were valued at $5,209,999, against $1,837,894 in July, 1919, and $5,268,126 in June, 1920. The item of machinery showed an increase of approximately $700,000 over the figures of a year ago, rails increasing $250,000, wire and manufactures of wire $250,000, billets $175,000, bar iron $100,000, and pig iron $575,000.

For the seven months period ending July, 1920, the iron and steel imports totaled $27,325,438, against $13,410,208 a year ago.

The imports of manganese ore and manganese oxide have again decreased. In July, 1920, these imports totaled 18,447 tons, against 80,329 in June, 1920, and 15,585 in July, 1919.

O. F. S.

Freyn, Brassert & Co., engineers and contractors, Peoples Gas Building, Chicago, have been retained by the E. & G. Brooke Iron Co. of Birdsboro, Pa., to act as consulting engineers in connection with the installation of bins, boilers, new electrical equipment and of blast furnace relining now nearing completion. They will supply twelve 10-in. Birkholz-Terbeck gas burners for their boilers.

Huntington Steel Foundry Reorganized

The Huntington Steel Foundry Co., Huntington, Ind., on Aug. 17 became the property of a new and refinanced company which will resume operations at once. William H. Armstrong, mayor of Racine, Wis.; E. T. Pelton, Chicago; N. I. Silver, Racine, and Leo Cohen, Chicago, bought up the common stock. The new company was organized with Mr. Armstrong as president, Mr. Pelton, vice-president, Mr. Silver, secretary, and Mr. Cohen, treasurer. Mr. Armstrong was for seven years secretary-treasurer of the Mitchell Motors Co., and is now president of the Armstrong Foundry Co, president of the Splitex Radiator Co., and vice-president of the American National Bank, all of Racine. Mr. Pelton has had over 20 years experience in the manufacture of steel castings. He was associated with the National Steel Foundries, Milwaukee, for a number of years and was then general manager of the Pelton Steel Co. of that city, which still bears his name. Recently he has been connected with Frank D. Chase, Inc., Chicago, acting in capacity of consulting engineer.

The company will specialize on electric steel castings, operating a general jobbing plant. The gray iron work will be discontinued.

Norwegian Iron-Ore Smelting

Ragnvald Blakstad, a Norwegian ironmaster, pointed out, in the course of a recent interview at Christiania, that Norway imports from 300,000 to 400,000 tons of iron and steel per annum, notwithstanding the fact that the country is one of the richest in iron ore in the world. In his opinion, it would easily be possible to produce from 4,000,000 to 5,000,000 tons of iron-ore concentrates every year and, by means of hydro-electric treatment, convert the ore into steel in quantities sufficient to meet the requirements of the country. Mr. Blakstad owns ironworks in the Tyssedal, having electric furnaces for the smelting of concentrates, but he is unable to obtain permission to carry on the work. If the water powers of the country were developed in a rational manner, Norway would not need to depend upon other countries for coal, it is claimed. It is believed that ultimately the realization of this aim will materialize.

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An Interchurch Addendum

The names of Bishop Francis J. McConnell, chairman of the commission of inquiry of the Interchurch World Movement, and Dr. Daniel A. Poling, vice-chairman, are signed to an open letter to THE IRON AGE, of which abstracts have been published in some newspapers. This letter is devoted largely to complaints that the criticisms of THE IRON AGE have not been fair and that aside from what has been said in our columns little attention has been paid to the report by anyone connected with the steel trade. The letter also devotes considerable space to favorable newspaper comments on the report. THE IRON AGE feels that no useful purpose would be served by the publication of the letter and the prolonged discussion on which the authors are counting to revivify their effort to put radical trade unionism in control of the steel industry.

In a comment published in these columns July 29 one of the statements of the Interchurch report was referred to as "false and reckless." Others might have been included in that category. The "open letter" again demonstrates the unfitness of the mouthpieces of the commission of inquiry by the facility with which it makes accusations based on flimsy hearsay. Somebody told somebody who told the commission that THE IRON AGE had charged that "a lot of Reds" made the Interchurch report, also that in what this journal had written it represented others than itself.

All that THE IRON AGE has written concerning the steel strike report it has written in the interest of truth and of fairness to the producers and consumers of steel, to employers in all industries and to the public. In reviewing the report it did not seek nor did it obtain the opinion of any officer of any steel company, but spoke of its own knowledge of labor conditions in the industry and of the aims of the strike leaders of 1919.

The editorial independence of THE IRON AGE is well known to its readers. We have conceived the relation of this journal to the steel industry to be very different from that of counsel for the defense against any and all criticism from whatever quarter. Our opinions as to the best means of improving relations between the steel companies and their employees have been expressed from time to time, and we look for the further adoption of conference and other plans for creating good will and allaying the antagonisms which most leaders of national labor unions seek to perpetuate for their own ends. We look also for the elimination of the "long turn" and the seven-day week, both of which exist to a far less extent than is charged in the Interchurch report; also for steady progress toward a three-shift basis throughout the industry. But these things are not what the strike of 1919 aimed at. Its aim was the complete control of the steel plants of the country as well as of opportunity to work in them, by a labor union autocracy. No amount of special pleading or of appeal to prejudice can cover up that naked issue.

Iron as Trade Barometer

The question has been asked of late whether iron is now the barometer of trade. Once the dictum was accepted quite commonly. The idea was that changes in business conditions generally were exhibited first in the iron and steel industry. It was not that conditions in the iron and steel industry exemplified conditions then existing in general business, for the comparison then would be with the meteorological instrument that shows the existing temperature rather than with the instrument that can be employed to predict changes in the weather.

Whether iron, or, to be more specific, the condition of the iron and steel markets generally, can now be consulted for prophetic indications of general business, may, perhaps, be answered by considering what made iron barometric in its indications in the past. There were several reasons, some of them interwoven one with another. There was the tendency of steel mills to sell their prod-

uct far ahead when favorable opportunity presented itself, thus being unable to execute new orders promptly, so that the buyer had to anticipate his wants. Then there was the so-called "open" or "option" contract, under which mills oversold themselves technically, and proved really oversold practically if the market advanced. Also there was the tendency of the steel market to move in long swings, with slowly but surely advancing prices for relatively long periods of time. In these three items one may be called cause and another effect, or *vice versa*. To cut the matter short, there were great "movements" in the market, and as they were coupled with the ebb and flow of general business they naturally were started early, as they had a long course to pursue. When iron and steel prices were in the trough or had just begun to ascend, buyers knew they would be safe in buying and that it would be unsafe not to buy, as in that event their deliveries would be delayed. Thus the iron and steel market was more or less barometric or prophetic in its showing.

In the period in which iron was accepted as the barometer of trade a large proportion of the iron and steel produced was used in construction work. In the typical case of a factory or a skyscraper the buying of the steel requisite was prophetic in two respects. In the first place, for the construction work the steel would be bought first and later the other materials and equipment, while the labor for erection would also be employed later. In the second place, the inception of the project represented the judgment of the investors that business was going to become more active, thus requiring the facilities or products contemplated by the construction job.

In the two respects above indicated iron cannot be regarded as barometric to the extent that formerly obtained. The steel market itself, with its two sets of prices, Steel Corporation and independent, is not permitted to indulge in a movement similar to those that occurred in pre-war times, while as to construction work, the amount of steel entering into large construction jobs has been a much smaller proportion of the total output, since the armistice, than formerly was the rule.

In another respect the steel market has been deprived of its barometric capability. Its largest customer was the railroad system of the country, and the railroads bought steel or articles made of steel when money was easy, and refrained from buying when money was tight, easy money producing expansion in general business and tight money leading eventually to contraction. In the future money for the railroads will not vary in easiness and tightness by anything like the range that formerly obtained, and railroad expenditures will be controlled quite largely by the Interstate Commerce Commission.

While developments in the iron and steel industry are not now, and may not be in future, as prophetic as they used to be, one important thing remains, that the iron and steel industry is a very large industry and its activity or quiescence must make an important showing as to industrial conditions generally. The steel business cannot be good when general business is bad, or bad when general business is good.

World Demand for Steel

There will be some surprise that American steel exports in July were so large in view of the transportation and labor handicaps in that month. As indicated elsewhere in detail, the July total was 489,223 gross tons, which is not only the largest amount for any month this year, but also for 1919, with one exception. The nearest approach this year was 420,359 tons in May, while the lowest record was 308,185 tons in February. Imports also showed a healthy increase, having been over 100,000 tons larger to Aug. 1 this year than to Aug. 1, 1919.

Not only were American steel exports the year's maximum in July, but those for Great Britain were also, as pointed out one week ago. The combined British and American steel exports for July afford a measure of the world's present demand for steel as compared with 1913. The month's total for the two countries was 882,239 tons, or the largest for one month in many years, if it has ever been equaled. In 1913 British exports averaged 420,457 tons per month, and those of the United States 228,803 tons—both records to that time. The world's demand on the two countries in 1913, including shipments between the two, was 649,560 tons per month, or much less than their combined exports last July. With Belgium and France doing little in exports, and Germany out of the reckoning, while Russia and Austria are no longer factors, the non-producing countries must depend on American and British sources of supply.

These figures are not only impressive, in view of financial and economic conditions the world over, but they are prophetic of what the world's needs may be when times are more normal.

Productiveness of Workmen

In the automobile and tire industries particularly, but in some other industries as well, there have been some remarkable experiences lately, of reductions in the number of employees being followed immediately by increases in the total output of the plant involved. We have already commented on some of these as giving practical proof of the contention that men were not working as hard as they should.

These experiences are straight to the point in showing how the strained economic situation into which we got after the war will be righted. To the general observation that there was "a shortage of labor" the rejoinder has been made that perhaps there was an excess of capital instead. The reply at first glance seemed to have merit, but it would not stand scrutiny. By no means has there been an excess of capital seeking investment. Of the sum total of all industrial activity in the United States since the armistice the proportion represented by what may be properly classed as capital investments has been far below the pre-war proportion. The steel industry, for instance, can furnish testimony along two entirely separate lines. Following the steel products made to their ultimate employment it is readily seen that the proportion going into construction

work representing capital investment has been quite below the pre-war average. Again, the steel industry has indulged in less new construction of its own than has been the normal average.

The shortage of labor has been chiefly a shortage in the amount of work done, or in the quality of work done, by the individual. Production and consumption should balance, but the tendency of the majority of workers has been to produce less in proportion to what they were consuming.

This is the condition that needed to be righted. The amount of improvement requisite varies widely in different lines of employment. In the iron and steel manufacturing industry conditions are fairly good. There is much testimony to the effect that labor is coming up to and for the most part has reached the same degree of efficiency as before the war. In factories in general there is opportunity for the management to bring about increased "efficiency," which is nowadays little else than the polite word for referring to the doing of good work or enough work. It has been almost if not quite an insult to ask some employees to "work hard."

In one great line of activity it is unfortunately the case that improvement is difficult to bring about, on account of the circumstances surrounding the work, and that is the building trades. Comparisons of the quantity of work done by the carpenter or the plumber or the electrician on a construction job are difficult and intricate, and cannot be presented to the employee in an impressive way. The various crafts involved are particularly well organized, and for years they have controlled apprenticing so well that a shortage in workmen has been produced. In almost any city at almost any time in the past year one could find the condition that all the carpenters, for instance, had jobs, yet it could be observed that the quantity of building in progress was not nearly equal to the natural requirements of the community. Many people have been led to the erroneous conclusion that building operations were as great as they should be, by unconsciously taking as the standard the number of men offering themselves for employment, instead of using as a standard the reasonable requirements of the community, in the repair of its existing buildings and in the erection of new buildings.

The matter of workmen becoming more productive can work itself out more or less satisfactorily in the case of factories, but the building trades are differently circumstanced. There is opportunity, however, for community effort. Thus far the average community has not recognized how greatly it is affected by union restrictions and union protection of the man who does not do a decent day's work. The matter has not been brought home because at any one time only a small proportion of the individuals in a community are trying to have construction work done. It is a feeling, however, that can be aroused. There are communities that tax land on its full appraised value and "improvements" at a fraction of their appraised value, the object being to stimulate building. The "single taxers" go much farther in desiring to stimulate building by removing all taxes from "improvements." The same community feeling directed against the restrictions of the building crafts would produce results. Here and there in the country some beginnings in this direction have been made.

Costs as Price Fixers

Apropos of some discussion in the iron trade on the proposition that higher freights and other increments in cost point to higher prices for pig iron and finished steel is this well reasoned comment from the current monthly circular of the National City Bank, New York:

One of the common fallacies is the theory that sellers can make any prices they please and are wholly responsible for prices, buyers occupying simply a passive position. We have an example of this theory in the presumption that the increase of freight charges will be multiplied several times over as passed on to the consumers of products. . . . In time of scarcity goods will bring high prices, in conformity to the law of supply and demand and regardless of costs. Prices depend primarily upon the relation between supply and demand.

Cost is a factor as fixing a limit below which prices will not be long maintained because the supply will fall off. Hundreds of producers sell their goods in common markets at substantially the same prices, although their costs may vary much more than the freight charges which enter into them. Freight charges are a common influence and undoubtedly a factor in prices, but prices are the result of all market conditions, while freight charges are a minor factor. The efficiency of railroad service is a much more important element in prices than the freight charges.

Prices have been so long in the hands of producers that the ordinary mind readily responds to the suggestion that higher cost factors will inevitably appear in market prices. In the period just ahead other considerations, some of them long ignored, are likely to demand attention.

The Wellman-Seaver-Morgan Co., Cleveland, has just been given a contract by the Georgia Alabama Power Co., Albany, Ala., for a 2750-hp. hydraulic turbine and governor. This will be a duplicate installation of two turbines placed with the Wellman-Seaver-Morgan Co. by the same interest, the second of which has recently been shipped. The Wellman-Seaver-Morgan Co. has also taken a contract from the Mississippi Glass Co., Florette, Pa., for three large gas producers, and from the Semet-Solvay Co., for a coke pusher and door machines for an extension to the by-product coke plant at the plant of the Cambria Steel Co., Johnstown, Pa.

Waite, McClave & Co., exporters and importers, have been incorporated to deal with the Orient with the head office at 81 Fulton Street, New York. Branches will be established at Shanghai, Hongkong and Tientsin. Later the company expects to open offices in India and the Straits Settlements. Iron and steel exports will be developed. E. B. Waite, who was for 10 years vice-president and general manager of Getz Brothers & Co., of the Orient, Ltd., will be in charge of the Far Eastern connections, and Albert E. Betts, formerly New York manager for the same concern, will be in charge of the office in New York.

Last week, sales representatives in the sash division of the Truscon Steel Co., Youngstown, Ohio, held their annual convention at the home office. Sessions were conducted at the company offices, with Gustave Kahn, general manager of sales and George F. Bateson, manager of sash sales, in charge.

CONTENTS

American Society for Steel Treating 629
Developments Leading Up to Its Formation—A National Research Laboratory—Convention and Exhibition

Heat Treating Automobile Drive Shafts 636
Plant of the Timken-Detroit Axle Co.—Waste Gases Used for Pre-Heating

Heat Treating Problem Solved By Applied Mechanics 637
Preventing Defects from Bending or Straightening Material During or After Heat Treatment

Tests on Tempering Certain Grades of Steel 639
Temperatures and Time in Hardening and Drawing of Tool, Ball Bearing and High Speed Steels

Welding Heat Treated Chrome Alloy Steel 641
Special Welding Machine Employed—Saving Defective Forgings

Critical Points in Steel Heat Treatment 645
Methods and Apparatus for Determining—Human Element as a Factor

Stress Results Within Elastic Limit 649
Term Recoverance Defined — Methods and Instrument for Obtaining Property Described

Association Lessens Labor Difficulties 654
How Industrial Situation Was Stabilized in Hartford by Organization of 160 Manufacturers

Pig Iron Production in August 660
For the Month, 3,147,402 Tons—Daily Output 2592 Tons More Than in July

Heavy Increase of Iron and Steel Exports 662
Japan as Buyer—Heavy Importing of Scrap—Movement of Machine Tools Declines

Shall Labor Get Control? 687
Charles Piez Says Steel Strike Was Deliberate—Attempt to Wrest Industry from Owners

Automatic Conveyor Furnace 642
New Heat Treating Furnace 644
Training Students in Industrial Management 638
Labor Inefficiency 651
Semi-Automatic Drill Jig 652
Alloy Steels in the Automotive Industry. 652
Self-Contained Motor-Driven Tool Grinder 652
Commerce Commission on Spotting Charges 653
Transportation Conditions in Valleys 657
New Norwegian Ore Smelting 657, 663
Basset Direct Steel Process 658
Chart Rolling Mill Practice 658
Phantom Guard for Grinding Machine 658
To Build More Ships 659
Commerce Regulation 659
Standard Parts Co. in Hands Receivers .. 659
Editorials 664
An Interchurch Addendum—Iron as Trade Barometer—World Demand for Steel—Productiveness of Workmen—Costs as Price Fixers
Railroad Tool Inquiries in Chicago 680
Foreign Market Conditions 680, 681
Ratings for Blast Furnaces 681
Unwarranted Conclusions Regarding Workday 686
Highest Puddling Rate 688
Check of Immigration Requires Labor Conservation 688
Short Trade Items 697

Iron and Steel Markets 668
Comparison of Prices 669
Non-Ferrous Metal Markets 682
Prices Finished Iron and Steel, f. o. b. Pittsburgh 683
Personal Notes 684
Obituary Notes 685
Machinery Markets and News of the Works 689
New York Jobbers' Prices 698

Iron and Steel Markets

A WAITING MARKET

Railroad and Other Buyers Not Concerned as to 1921 Prices

Larger Production and Freer Movement of Pig Iron and Steel

The waiting attitude of buyers of pig iron and steel has been more marked in the past week. Pressure for early supplies of everything in finished steel, with the possible exception of tin plate and wire products, has disappeared. The railroad buying, on which very considerable expectations have been built, waits on definite financing plans, and buyers generally seem confident that they can get steel for 1921 when they need it and at prices not above those of to-day.

Pig iron production in August, under better railroad operation, rose to a point only exceeded this year by March and in 1919 by January alone. The total was 3,147,402 gross tons, or 101,529 tons a day, as against 3,067,043 tons in July, or 93,965 tons a day. September promises further increase. Twenty-three furnaces blew in last month and five blew out—a net gain of 18. On Sept. 1 the estimated daily capacity of the 311 furnaces in blast was 104,265 tons a day, against 93,965 tons a day for 293 furnaces on Aug. 1.

With the large volume of unshipped orders that is on the books of the mills, prices are little affected by the halt in buying, but the basis of future contracting is concededly a two-sided question, whereas in July the shortage in steel supply seemed the decisive factor.

Rail orders actually on the books of the steel companies are not large for the time of year. A good deal of track repair and car repair work is going on, but while large rail orders are expected for 1921, the $60 price talked of by some sellers is questioned by the railroads. At the same time there is no assurance that the $47 price of the Steel Corporation will continue, its rail bookings being subject to the price that may be fixed on Jan. 1.

An inquiry has appeared at Chicago for 5000 freight cars, requiring 50,000 tons of steel, and a repair contract is pending for 1000 hopper car bodies. The Wheeling & Lake Erie is asking for 500 to 1000 box cars and 500 to 2000 gondolas.

Indications point to an exporting rate by the Steel Corporation of practically 20 per cent of its output. As a matter of fact, statistics for July show total steel exports of about 434,000 tons (pig iron and scrap making 55,000 tons additional) or over 17 per cent for the whole industry, reckoning the monthly production at 2,500,000 tons of finished steel.

Between 40,000 and 50,000 tons of standard section rails in several large lots for export are under negotiation.

An interesting cross-current in export trade is the resale and reshipment to this country of 5000 boxes of tin plate from Buenos Aires—an illustration of the drawing power of a high price sustained for months.

In the East 9000 tons of structural work was contracted for, mostly for large buildings, but new offerings include 1200 tons for the New York Central and 500 tons for the Hudson River vehicular tunnel. A hotel addition in New York involving 5000 tons is also under active consideration.

One Southern pig-iron producer is credited with July and August sales of 100,000 tons for 1921, practically all on the basis of $42 at furnace. Sales in that territory this month have been very light and the pig iron market in the North also shows clear indications of decreased demand. While prices, as a rule, are not quotably lower, the easier conditions of the coke market, with lower prices confidently expected, give promise that the cost of making pig iron will decrease and melters, appreciating this fact, are slow to buy at present high level prices. Cincinnati sales in the week have been the smallest of the year. In the East, there is marked scarcity of iron for prompt delivery, especially basic. The delivery of iron, particularly in the Pittsburgh district, shows improvement.

In the Chicago district the leading interest has fixed $39 and $39.50 as the prices of foundry iron and malleable respectively, to its regular customers, on shipments from the Milwaukee furnace in the fourth quarter. On the last distribution of iron from this furnace, prices were also several dollars a ton below those generally asked.

A significant development in Alabama is the changing of two steel works blast furnaces from basic iron to foundry iron, the diminished demand for ship plates reacting on open-hearth steel output so that less basic pig is needed.

Pittsburgh

PITTSBURGH, Sept. 7.

The iron and steel industry for the most part still is marking time, with no pronounced activity in any direction, and with prices showing virtually no change. The belief continues to strengthen that pig iron prices have touched high water mark, and while few are willing to admit the possibility of an early recession, it is a fact that shipments are moving forward against contracts with considerable freedom, and as far as the steel making grades are concerned talk of shortages has almost disappeared. In view of the quieting down in the demand for steel it would appear to be but a step for the non-integrated companies to become oversupplied with iron and for resale tonnages to appear on the market. The coke market, after a period of firmness, again has a downward slant, and this, of course, is bound to have some influence on pig iron prices, despite the very full order books of the merchant producers. A sale of 2000 tons of foundry iron to a Pittsburgh district consumer is noted for last quarter shipment, to be sold on the basis of trade paper quotations for Valley iron, although the iron will come from Cleveland furnaces.

The market in semi-finished material has strength-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept. 7, 1920	Sept. 2, 1920	Aug. 10, 1920	Sept. 9, 1919
No. 2 X, Philadelphia‡	$53.51	$53.51	$50.90	$30.60
No. 2 Valley furnace†	50.00	50.00	46.00	26.75
No. 2 Southern, Cin'ti†	46.50	46.50	45.60	31.10
No. 2, Birmingham, Ala.†	42.00	42.00	42.00	27.75
No. 2, furnace, Chicago*	46.00	46.00	46.00	26.75
Basic, del'd, eastern Pa.	51.26	50.67	44.40	26.60
Basic, Valley furnace	48.50	48.50	48.50	25.75
Bessemer, Pittsburgh	50.46	50.46	48.40	29.35
Malleable, Chicago*	46.50	46.50	46.50	27.25
Malleable, Valley	50.00	50.00	46.00	27.25
Gray forge, Pittsburgh	50.96	50.96	44.40	27.15
L. S. charcoal, Chicago	57.50	57.50	57.50	32.75
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$55.00	$55.00	$55.00	$45.00
O.-h. rails, heavy, at mill	57.00	57.00	57.00	47.00
Bess. billets, Pittsburgh	60.00	60.00	60.00	38.50
O.-h. billets, Pittsburgh	60.00	60.00	60.00	38.50
O.-h. sheet bars, P'gh.	68.00	68.00	70.00	42.00
Forging billets, base, P'gh.	75.00	75.00	85.00	51.00
O.-h. billets, Philadelphia	65.74	65.74	69.10	42.50
Wire rods, Pittsburgh	75.00	75.00	75.00	52.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	4.85	4.85	4.75	2.745
Iron bars, Pittsburgh	4.75	4.75	4.75	2.75
Iron bars, Chicago	3.75	3.75	3.75	2.62
Steel bars, Pittsburgh	3.25	3.25	3.25	2.35
Steel bars, New York	4.13	4.13	4.02	2.62
Tank plates, Pittsburgh	3.25	3.25	3.25	2.50
Tank plates, New York	3.63	3.63	3.52	2.77
Beams, etc., Pittsburgh	3.10	3.10	3.10	2.45
Beams, etc., New York	3.48	3.48	3.27	2.72
Skelp, grooved steel, P'gh.	3.25	3.25	3.25	2.45
Skelp, sheared steel, P'gh.	3.50	3.50	3.50	2.65
Steel hoops, Pittsburgh	5.50	5.50	5.50	3.05

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Sept. 7, 1920 Cents	Sept. 2, 1920 Cents	Aug. 10, 1920 Cents	Sept. 9, 1919 Cents
Sheets, black, No. 28, P'gh.	7.50	7.50	7.50	4.35
Sheets, galv., No. 28, P'gh.	9.00	9.00	9.00	5.70
Sheets, blue an'l'd, 9&10	6.00	6.00	6.00	3.55
Wire nails, Pittsburgh	4.25	4.25	4.25	3.25
Plain wire, Pittsburgh	3.75	3.75	3.75	3.00
Barbed wire, galv., P'gh.	4.45	4.45	4.45	4.10
Tin plate, 100-lb. box, P'gh.	$9.00	$9.00	$9.00	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$38.00	$38.00	$38.00	$24.00
Carwheels, Philadelphia	42.00	42.00	40.00	24.50
Heavy steel scrap, P'gh.	29.50	30.00	27.50	19.50
Heavy steel scrap, Phila.	26.50	26.50	23.50	18.50
Heavy steel scrap, Ch'go.	26.00	26.00	24.50	18.50
No. 1 cast, Pittsburgh	42.00	42.00	41.00	23.50
No. 1 cast, Philadelphia	40.00	40.00	38.00	25.00
No. 1 cast, Ch'go (net ton)	35.00	35.00	36.00	24.00
No. 1 RR. wrot, Phila.	33.00	33.00	33.00	26.50
No. 1 RR. wrot, Ch'go (net)	24.50	24.50	24.50	19.00
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$17.00	$17.00	$18.00	$4.75
Furnace coke, future	14.00	14.00	14.00	4.75
Foundry coke, prompt	18.00	18.00	19.00	5.50
Foundry coke, future	14.00	14.00	14.00	5.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.75	19.00	19.00	23.00
Electrolytic copper, N. Y.	18.75	19.00	19.00	22.50
Zinc, St. Louis	7.90	8.10	7.80	7.35
Zinc, New York	7.90	8.45	8.15	7.70
Lead, St. Louis	8.62½	8.75	8.75	5.75
Lead, New York	8.50	8.75	9.00	5.90
Tin, New York	45.00	45.75	48.00	56.50
Antimony (Asiatic), N. Y.	7.00	7.00	7.25	9.25

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

ened slightly, but pressure to sell has not entirely disappeared, as it still is possible to secure sheet bars for less than $70, and some buyers report offerings at less than $68, the recent minimum. In the finished lines the flattening out in the demand in the past few weeks has resulted here and there in some softening of the undertone. This is notably the case in sheets, where the slump in the demand from the automobile industry is said to have led some makers who had been devoting the greater part of their production to that industry to seek tonnages of other finishes. Pressure for early supplies of everything in finished steel, with the possible exception of tin plate and the common wire products, has largely vanished. A much quieter market also exists in old material, following the recent big purchases by the Steel Corporation subsidiaries and some of the independent steel companies.

Although the recent betterment in the movement of steel from the mills appears to have been due to a considerable extent to a drive to get steel into transit before the recent freight rate increase became effective, it must be said that on the whole transportation conditions are more satisfactory now than they were a few weeks ago. The Interstate Commerce Commission has not yet acted on the request that open top cars, with sides up to 42 in., be restored to general service, but word of a favorable decision in this direction is expected shortly. Opinion is divided as to whether the Interstate Commerce Commission will extend order No. 7 when it expires on Sept. 21. It is believed, however, that if the extension is made it will be considerably modified. Placing of cars for the movement of oil country pipe to the Southwest has helped out makers here and in Youngstown, and the fact that box cars, moving into the grain belt, may be loaded has assisted the movement of those products which, for the sake of safety, have to be shipped in that kind of equipment.

No sign of railroad equipment buying yet has appeared in this district, and the belief is held in well-informed quarters that little such buying will be done until more reasonable prices prevail. The present cost of steel open-top cars is from $3,300 to $3,400 each, or about triple what such equipment was priced at just before the war, while all steel box cars show a similar increase, now being priced at slightly above $5,000 each. It is said that the large increase is in the patented parts, such as springs, journal boxes and axles.

Pig Iron.—The past week has been just as quiet as the previous one, and outside of occasional carload lots which have been moved at the recognized market prices the only important business has been the sale of 2000 tons of foundry iron for last quarter shipment to the Westinghouse Airbrake Co. at THE IRON AGE quotation for Valley iron. This iron comes from furnaces having a freight rate into the Valley equal to that from the Valley into Pittsburgh. The sale is noted of 500 tons of No. 2 foundry to a Pittsburgh district machinery company for last quarter, which the buyer claims he secured at less than $49, furnace. Shipments of iron from the furnaces are comparatively full and the anxiety of melters about future requirements largely has vanished.

The average price of Bessemer pig iron at Valley furnace for August, as compiled by W. P. Snyder & Co., Pittsburgh, was $47.393, and of basic $48.373, as compared with $46.015 and $45.806, respectively, in July.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$48.50
Bessemer	48.50
Gray forge	49.00
No. 2 foundry	50.00
No. 3 foundry	49.50
Malleable	50.00

Ferroalloys.—Prices of ferromanganese still favor buyers, as consumption is not equal to the supply and sellers still are seeking buyers. English material is being offered by some makers at $165, Atlantic seaboard, and this price is being met by domestic pro-

ducers. Only small lots are being sold and $175, delivered Pittsburgh district, which figures back a little below $170 at the seaboard, is as high as any such lots recently have sold. We note a small sale at $170 delivered, this district, and the buyer gets a concession of $2.50 from this figure if the material falls below 77 per cent manganese content. On resale tonnages, some of which have not yet been cleaned up, $165 delivered this district, probably could be done. One maker of spiegeleisen has increased his price to $82.50, furnace, for 19 to 21 per cent alloy, but no sales have been made here at higher than $80, furnace, and that was several weeks ago and before ferromanganese showed any real weakness. High coke costs and the advance in freight rates are behind this advance, but buyers are paying little attention to what is said about producing costs and governing purchases by their actual requirements. These, it may be said, are neither large nor urgent. Recent increase in quotations by makers of 50 per cent ferrosilicon is looked upon by buyers here as an effort to stimulate purchases and they are not falling over one another to obtain supplies. A quotation of higher than $80, furnace, freight allowed, finds no basis in sales here. Bessemer ferrosilicon is inactive and nominal in price. Electrolytic ferrosilicon averaging 12 per cent is being offered in pig form at $65, furnace, by a Niagara Falls producer, more than $10 per ton below the quotation of Jackson County, Ohio, makers, not to mention the additional saving in freight.

We quote 76 to 80 per cent domestic ferromanganese $165 to $170, seaboard, for either prompt or deferred shipment; the same prices are being quoted by English makers. We quote average 20 per cent spiegeleisen at $80, furnace and 50 per cent ferrosilicon at $75 to $80, furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces as follows: 9 per cent, $66; 10 per cent, $69.50; 11 per cent, $72.80; 12 per cent, $76.10. Silvery iron, 6 per cent, $56.50; 7 per cent, $58; 8 per cent, $60; 9 per cent, $62; 10 per cent, $64.50; 11 per cent, $67.80; 12 per cent, $69.80. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets and Sheet Bars.—A somewhat stronger tendency is observed in both sheet bars and billets, due to the fact that improvement in the railroad transportation situation has brought a reduction in mill stocks of finished steel to a point where more finishing capacity can be employed, while it also has resulted in a freer movement of semi-finished material into regular consuming channels. Integrated manufacturers are using more semi-finished steel and with the larger movement against contracts and steel works activities more nearly even with mill operations, offerings of billets and sheet bars have contracted materially. Recent weakness in these forms of steel was the result of the maintenance of a higher rate of steel works than of finishing mill operations, this resulting in a considerable surplus of semi-finished. While prices are not appreciably different from those of a week ago, it is observed by buyers that billets are not as readily obtained at $60, Pittsburgh or Youngstown, as recently, and $70, Pittsburgh or Youngstown, again is the more common minimum on sheet bars from independent mills, although some business continues to be heard of at around $68 and instances are reported where makers, presumably for financial causes, have offered to take on business for even less than that. One Eastern maker of sheet bars is reported to have recently closed on a large tonnage of billets and for that reason has withdrawn from the market on the former.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $38 to $65; 2 x 2-in. billets, $42 to $70; Bessemer sheet bars, $42 to $65; open-hearth sheet bars, $42 to $70, and forging billets, ordinary carbons, $75 to $80 base, all f.o.b. Youngstown or Pittsburgh mill.

Wire Rods.—Independent makers still have pretty stiff price ideas, especially on inquiries from other than regular customers. Against such inquiries, most makers are quoting $80, mill, for common soft rods. Orders from regular customers, however, do not carry a higher price than $75. Small tonnages of rivet rods for immediate shipment are reported to have sold as high as $85, mill, recently. Prices are given on page 683.

Plates.—No improvement can be reported in the demand, which, because of the contraction in structural and shipbuilding operations and the failure of expected railroad equipment orders to materialize in volume, is exceedingly narrow. Neither of the car building companies in this district has yet had any railroad business and both are well covered on plates against such orders as are on their books. Independent makers generally are holding to 3.50c., Pittsburgh, for sheared tank quality plates and some claim to have passed up business carrying a lower price, but it is believed that few, if any, would decline attractive tonnages at 3.25c. and that figure represents the more general maximum on any recent business done here. Any semblance of strength the market may possess is due to the fact that the manufacturers have bookings of other lines which are more profitable and are diverting the steel away from plates into those channels.

We quote sheared plates of tank quality, ¼ in. and heavier for early delivery from independent mills at 3.25c. to 3.50c., Pittsburgh. The Carnegie Steel Co. still quotes 2.65c. and is accepting business at that figure, but is not guaranteeing early delivery.

Structural Material.—The largest piece of structural business taken by the fabricating interests here is one of 1000 tons for five bridges to be constructed by the Pennsylvania Railroad in Philadelphia, which went to the McClintic-Marshall Co. No other lettings of importance recently have been received and strictly Pittsburgh district projects appear to be largely dormant. The contract for a highway bridge across the Piscataqua River at Portsmouth, N. H., involving 2000 tons, is to be let Sept. 13, and is being watched with much interest here. Fabricating shop activities remain at a low ebb, some because of the continued inability to obtain steel, but in most cases because of the lack of double length flat top cars for the movement of fabricated material. The market in plain structural steel continues dull and easy. Not much difficulty to-day is being experienced in obtaining bars for delivery during the last quarter of the year at 3.50c., and while independent makers of shapes are talking of higher prices 3.10c. still is regarded as the going market price on beams. The plate market quoted from 3.25c. to $3.50., but the latter figure is more of an asking than a selling price. Prices are given on page 683.

Iron and Steel Bars.—Some makers of merchant steel bars continue to quote 4c. and probably are obtaining this figure against tonnages for delivery over the next 30 or 60 days. There has been a considerable tapering off, however, in the demand for such tonnages, and 3.50c. measures the general maximum of independent makers against business for delivery during the last quarter of the year. Reinforcing bars share with structural shapes the absence of new construction. Makers of iron bars appear to be well sold out for the remainder of this year, and are not actively seeking additional bookings. Bars of this sort made in this district hardly come within the classification of common iron, being at least partly refined. Makers consequently are quoting 5c. as a minimum and 5.50c. on what is classified as refined iron. Chicago mills are quoting common iron bars at 3.75c., Chicago, the equivalent of 4.13c., Pittsburgh. Movement of steel bars against contract is comparatively good from outside districts in the direction of Pittsburgh, because of the advantage they have in loading cars in the direction of the mines. In this district proper, no small part of the movement is by motor truck. Accumulations, particularly of the Duquesne works of Carnegie Steel Co., still are comparatively heavy.

We quote steel bars rolled from billets at 2.35c. this being the price of the Carnegie Steel Co. for very indefinite delivery, likely not before first quarter of next year. Other mills rolling steel bars from billets quote from 3c. to 3.50c. at mill, prices depending entirely on the buyer and the delivery wanted. We quote reinforcing bars, when rolled from billets, at 3.75c. to 4c., and from old steel rails at about 3.50c. at mill. We quote common iron bars at 4.75c. and refined iron bars at 5c. to 5.50c. in carloads, f.o.b. mill, Pittsburgh.

Wire Products.—Coincident with the adoption of a new card of extras on nails, the American Steel & Wire Co. revised upward some of its extras on wire, approximating the independent schedules for annealing and galvanizing. The leading Pittsburgh independent steel company has adopted a new card of extras on

cement coated nails, effective Sept. 1. Extras on these nails vary with the different companies and base prices also vary a good deal, independents quoting from $3.60 per count keg to $4.10. The American Steel & Wire Co. still is quoting a base of $2.85 and the old card of extras, which averages about 25c. per 100 lb. below the card of the independent manufacturers. Demand for nails and other common wire products holds good despite a freer movement against old orders. Apparently, however, the reduction of obligations is not rapid, as few companies are accepting more than 40 or 50 per cent of the business offered, even from their regular customers. Mills in this district are averaging about 75 per cent of capacity operations, but production is below that rate because of the shortage of some kinds of labor and the fact that the general average of efficiency is low.

We quote wire nails at $3.25 base, as the price of the American Steel & Wire Co. and $4.25 to $4.50 by independent mills. We quote bright basic wire at $3, the price of the American Steel & Wire Co. and $3.75 to $4, the price range of the independent mills.

Nuts, Bolts and Rivets.—The Pittsburgh Screw & Bolt Co. has issued a new list of discounts, approximating those established recently in some of the other manufacturing centers. The new discounts, which probably will be adopted by other makers here, apparently are not applicable to unfilled or unshipped tonnages, but refer to prompt shipment sales or sales to irregular customers. Makers here have little tonnage over and above the specifications of their regular trade and the indications are that an allotment of fourth quarter production will be necessary. Prices and discounts are given on page 683.

Spikes.—Inquiries for standard spikes are neither numerous nor large at the moment, but fairly good demand is noted for small spikes for coal mine tracks and some business is reported in them up to 6c. base, Pittsburgh, for prompt shipment. Present bookings of makers here are sufficient to engage capacity for six to eight weeks. Prices are given on page 683.

Hot-Rolled and Cold-Rolled Strips.—Some makers still are charging 6c. base, for hot-rolled strips and 9c. base, for cold-rolled, but these prices appear to be maximums and premiums so readily obtainable a few weeks ago on tonnages for early delivery largely have disappeared. This development can be ascribed to the slump in the automobile and allied industries, the demands of which were largely responsible for the fancy prices of earlier in the summer. A few makers still are billing hot-rolled at 5.50c. base and cold-rolled at 8.50c. base. Demands from other sources are said to be making good to some extent the loss of business from the automotive industry.

Cold-Finished Steel Bars.—The Ford Motor Co. continues to seek spot tonnages, but as a rule the automobile companies now appear content to wait tonnages due them on contracts, and are doing practically no buying. Passing of this spot demand has been accompanied by a disappearance of high prices, although a sale is noted of 600 tons for delivery in the next 60 days, at 6c., base, Pittsburgh. Shortage of flat bars still is pronounced, as the hot mills at present are not rolling very heavily on this class of material. The full range of prices on cold-finished steel bars is from 4.10c. to 6c., but it may be said that 4.25c. to 4.50c. is more representative of to-day's market.

Hoops and Bands.—Although the demand admittedly is light the fact that independent makers have not yet reached a point where they have to seek new business is keeping prices firm. The Steel Corporation price is 3.05c. and that of the independents 5.50c.

Iron and Steel Pipe.—Conditions show no material change from those of a week ago except for the fact that there no longer is much speculative, or what has been known in the trade as "boot legging" demand, for oil country pipe. Movement of this class of pipe from Pittsburgh and Youngstown mills has benefited materially by the placement of 60 cars daily for such shipments. The National Tube Co. has not materially reduced its accumulated stocks, save possibly at its Lorain, Ohio, works, which has benefited by the availability of cars going to the lake ports loaded with coal. Shipping conditions at the Wheeling works of this company, and for that matter at other plants in that district, still are bad, and at its McKeesport plan, congestion is so acute that it may soon be necessary to again curtail operations. Storage space for butt-weld pipe is said to be nearly exhausted. Independent companies still are working a new card on oil country pipe, covering the recent freight rate increase. Although independent prices on oil country pipe range from $7 to $10 per ton above those of National Tube Co., and the freight rate increase could be absorbed without much loss, it is claimed that this is not possible at present because of the comparatively low rate of operation and the extremely high overhead. Prices and discounts are given on page 683.

Tin Plate.—Although some makers have noted a slight falling away in new inquiries in the past week or so, the more general report is that buyers are as insistent for supplies as they have been at any time recently. Tin plate shipments West have been helped by the fact that box cars going into the grain belt have been made available for loading. This, however, does not help out the position of the Eastern makers of containers and they are still striving earnestly to get a place on the books of makers. It is claimed that no trouble whatever would be experienced by makers in obtaining $8.50 per base box for production tin plate for last quarter shipment, and that even $9 might be obtained. It is noted, however, that the recent inquiry for 200,000 base boxes for fourth quarter shipment was not placed because the buyer would not go above $8. Mill stocks are very much lighter than they have been, but all makers are several months behind in their quotas.

We now quote tin plate to domestic consumers for remainder of the year delivery at $7 to $9 base box; stock items $9 to $10, and for export $11 to $12 per base box, all f.o.b. Pittsburgh.

Sheets.—In general the market does not appear to be as strong as it was recently, because the decline in the specifications of the automobile industry has been progressive, and this has made it possible for a number of makers to give more attention to orders for other finishes and make better deliveries against such lines. The story still is current that 10c., or higher has been done on galvanized sheets, but when run down it is found that delivery in four to six weeks is guaranteed and that only small tonnages are involved. In a general way, the prompt market in this class of material from independent mills is quotable from 9c. to 9.50c. The market in the heavier gages of blue annealed sheets is affected by competition from plate makers and black sheets are not running so high in price as they did recently because in the case of some companies the bulk of the business was in automobile tonnage, which has been held up. Prices are given on page 683.

Steel Rails.—Fairly good demand still is coming out for light rails in this district, with prices holding within the recent limits. Outside of the admission that the railroads tributary to Pittsburgh have completed their 1921 specifications for standard rails, nothing definite either as regards prices or tonnages is made public.

The Carnegie Steel Co. is still quoting the March 21, 1919, prices, these being 2.45c. for 25 to 45-lb. sections, 2.49½c. for 16-lb. and 20-lb. sections, 2.54c. for 12-lb. and 14-lb. sections, and 2.58½c. for 8-lb. and 10-lb. sections. This company is also quoting standard sections 50 lb. and heavier at $45 for Bessemer and $47 for open hearth stock. The Cambria Steel Co. is quoting 25-lb. to 45-lb. sections at 3.75c., 16-lb. and 20-lb. sections, 3.79½c., 12-lb., 3.84c., at mill, for such delivery as it can make. The Jones & Laughlin Steel Co. is quoting light rails at 3.25c. for 25 to 45-lb. sections.

Coke.—The market showed some strength over the latter part of the week due to a falling away in the car placements, which affected production, and also to some extent demands occasioned by fears of a decline in oven output as a result of the Labor Day holiday. The market moved up to a minimum of $17.50 per net ton, oven, for furnace grade, and some

business was done as high as $18. The fears about the effect of the holiday upon oven operations, however, appear to have been unfounded, and since the car placement to-day was a liberal one, there was a flood of offerings which wiped out the advance of the latter part of last week. A few sales were reported early to-day at $17.50, but later producers and brokers freely were offering tonnages at that figure, and sales were made down to $17. Indications point to a good car set-up to-morrow, and expectations of a further decline are strong. Free offering of foundry coke remains comparatively light, and selected fuel is moving fairly promptly at the usual premium of $1 per ton above the price of furnace grade. Almost nothing is being done in contracts for either the last quarter of this year or the first quarter or half of next year. If any business of this sort were done to-day in furnace coke, it probably would be at around $12 per net ton, oven, that price being about as high as any of the furnace interests uncovered against last quarter requirements would pay at the moment. The fact that the coal requirements both of New England and the Northwest has been pretty well met, and the belief that if there is an extension of the order directing coal to these districts after Sept. 21, it will be considerably modified encourages expectations of lower coal prices, and it is figured that coal cannot drop much without affecting the price of coke.

Old Material.—Trading is on a much lighter scale than it has been recently, but while the market is softer in some directions, this may be ascribed to the fact that dealers rather than melters now are buying, and in the main the prices established by the recent heavy mill purchases are fairly well maintained. It might be difficult to sell heavy melting steel at higher than $30, delivered, to the steel companies in this district, for most of them are well covered. Dealers, having sold big tonnages of this grade at from $29 to above $31, now naturally enough are inclined to talk prices down, but it is idle for steel makers to expect to buy for much under recent prices. Heavy steel scrap must be regarded as cheap at $30, so long as pig iron hovers around the $50 mark. Bundled sheet sides and ends have sold up to $18 in the week under review and are not particularly plenty, as one big sheet company, which in the past has sold its scrap, now is finding a use for it in its own furnaces. Principal users of machine shop turnings in this district are getting fairly large shipments against old orders and have modified their bids, not now offering more than $16.50 for this grade. All kinds of cast scrap are scarce. It is estimated that more than 200,000 tons of steel works scrap were sold on the recent flurry of activity. Steel Corporation purchases, for delivery at Vandergrift, Munhall and Donora, Pa., are said to have aggregated about 150,000 tons and those of a large independent company at approximately 50,000 tons.

We quote for delivery to consumers' mills in the Pittsburgh and other districts that take Pittsburgh freight rates as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen Midland and Pittsburgh, deliv.	$29.50 to $30.00
No. 1 cast (for cupola)	42.00 to 43.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh	39.00 to 40.00
Compressed sheet steel	25.00 to 25.50
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh, dist.	17.00 to 18.00
Railroad knuckles and couplers	31.50 to 32.00
Railroad coil and leaf springs	31.50 to 32.00
Railroad grate bars	30.50 to 31.00
Low phosphorus melting stock (bloom and billet ends, heavy plates) ¼ in. and heavier	35.00 to 36.00
Railroad malleable	35.00 to 36.00
Iron car axles	53.00 to 54.00
Locomotive axles, steel	42.00 to 43.00
Cast iron wheels	43.00 to 44.00
Steel car axles	42.00 to 43.00
Rolled steel wheels	31.00 to 32.00
Machine shop turnings	16.50 to 17.00
Sheet bar crop ends (at origin)	31.50 to 32.00
Heavy steel axle turnings	24.00 to 25.00
Short shoveling turnings	20.00 to 20.50
Heavy breakable cast	37.00 to 38.00
Stove plate	31.50 to 32.00
Cast iron borings	20.50 to 21.00
No. 1 railroad wrought	33.00 to 34.00

British Iron and Steel Market

Coal Situation the Important Factor—Galvanized Sheets Weaker—German Competition

(*By Cable*)

LONDON, ENGLAND, Sept. 6.

The labor situation is increasingly serious. The notices the colliers have given of their threat to strike expire Sept. 25. Many people believe the men are bluffing, but indications are that the Government will again make concessions to avoid trouble. Organized labor is, however, reluctant to support the coal miners, and public opinion is dead against them. A lockout of electricians was initiated in Sheffield on Monday; 10,000 men are idle, but over a million may be affected almost immediately owing to the fact that electric power plants will cease operating and works will be forced to close. The Government has appointed a court of inquiry, and pending a decision of the questions at issue has asked for a resumption of work.

The Cleveland pig iron market is unaltered. Home requirements still absorb the output of the foundry making furnaces. There is an undue proportion of the lower grades of iron owing to the irregular supplies of fuel. Foreign inquiry is falling off. Germany is competing in the export market. Makers of hematite iron are heavily booked and are quoting only on small quantities. Some supplies are available for export against a pressing demand overseas.

The foreign ore market is dull. Business in Bilbao Rubio is still done at 47s. to 48s. ex-ship, Tees.

Finished steel prices are firm. Makers appear not to be greatly perturbed by the coal crisis, as they feel the time is ripe for a final settlement of the wage question. Most works will close at once if the strike occurs. There is small improvement in home deliveries.

The Clyde shipbuilding industry has created a new record. In the first eight months of the year 139 vessels were launched, of 430,244 tons. The Clyde shipbuilders will post lockout notices on Wednesday applying to platers and their helpers.

German steel is being offered regularly at falling prices. Quotations now ruling are approximately as follows: Merchant steel bars, £25; plates, ⅜-in., £28; ¼-in., £31 10s.; 3/16-in., £34; sheets, No. 20 gage, £38 10s.; hoops, hot rolled, £28; hoops, cold rolled, £40; wire rods £24, all on an f.o.b. basis.

Tin plates are dull, awaiting the issue of the coal situation. Works will close at once if the strike materializes. Galvanized sheets are weaker.

We quote per gross ton except when otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.54 for £1, as follows:

Ship plates	£26	0 to £33	0	$92.04 to	$116.82
Boiler plates	30	0 to 35	0	106.20 to	123.90
Tees	26	10 to 32	0	93.81 to	113.28
Channels	25	15 to 31	5	91.16 to	110.62
Beams	25	10 to 32	0	90.27 to	113.28
Round bars, ¾ to 3 in.	28	0 to 33	10	99.12 to	118.59
Rails, 60 lb. and up	25	0 to 27	0	88.50 to	95.58
Billets	22	0 to 24	0	77.88 to	84.96
Sheet and tin plate bars, Welsh	23	10		83.19	
Galvanized sheets, 24 g.	43	0		152.22	
Black sheets, 24 g. to 26 g.	50	0 to 54	0	177.00 to	191.16
Tin plate base box*	2	18		10.27	
Steel hoops	38	15 to 39	0	137.17 to	138.06
Cleveland basic iron	11	15		41.49	
West Coast hematite	14	15		52.21	
Cleveland No. 3 foundry	11	5		39.92	
Ferromanganese	35	0 to 40	0	123.90 to	141.60
Coke	3	2¾		11.10	

*Prompt delivery; for Oct.-Dec. 54s. ($9.56).

Independent steel producers and the Steel Corporation subsidiary in the Youngstown district have granted railroad employees operating within their plants increases in wages averaging 13 per cent, retroactive from May 10, 1920, to conform to the advance granted trainmen of the trunk lines. Under the new scale locomotive engineers will be paid 96 cents an hour, conductors, 93 cents, brakemen, 81 cents and firemen, 73 cents, with time and a half for all time over eight hours. While these wages prevail, there are some variations in the different mills.

Chicago

CHICAGO, Sept. 7.

With the exception of the leading interests, producers find the market dull in most departments. Railroad buying has not yet developed in large volume and implement manufacturers have done little contracting for fourth quarter. The feature of the market is the appearance of two confidential railroad inquiries, one calling for 5000 miscellaneous freight cars the other for repairs on 1000 hopper car bodies. With the exception of cast iron pipe, which has advanced in some sizes through a readjustment of differentials, prices remain about the same as heretofore. Mill and furnace operations in this district have shown little change but shipments are improving.

Pig Iron.—The market is generally quiet, although the leading merchant iron producer reports that bookings are normal for this time of the year and that suspensions fewer than last spring. Generally speaking, however, it would appear that suspensions or cancellations received from foundries serving the automobile industry have resulted in heavier shipments to other melters. These heavy receipts of iron may account for the lack of new inquiry. The demand for spot iron has fallen off noticeably, but this is explained by the heavy purchases made before the new freight became effective. A second Virginia furnace has opened its books for first quarter at $50, base furnace, but it is not believed that any business has been booked at that price in this district. A sale of 400 tons of malleable, part of which was slightly off grade, has been made in this territory at $48.25, Ohio furnace. The leading steel interest is offering a moderate tonnage of foundry and malleable for fourth quarter shipment at $39 and $39.50, Milwaukee, respectively. This furnace has been selling consistently under the ruling market quotation, and the last time it took business named prices several dollars below those now offered. There is a fair demand for spot charcoal and an inquiry for 500 tons for first quarter delivery is before the trade. Beehive coke prices have softened somewhat, foundry coke now being available at $18.50, Connellsville, and furnace coke at $16.50. By-product foundry coke in this district has been advanced to $18 per net ton, ovens, to cover the increase in freight rate from Connellsville to Chicago.

The following quotations are for iron delivered, at consumers' yards except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 70c. per ton.

Lake Superior charcoal, averaging sil. 1.50 (other grades subject to usual differentials), deliv. at Chicago...	$58.50
Northern coke, No. 1, sil. 2.25 to 2.75 last half	48.25
Northern coke, No. 1 spot	48.25
Northern coke foundry, No. 2, sil. 1.75 to 2.25 last half	46.00
Northern coke, No. 2 spot	46.00
Northern high phos., last half	45.00
Southern coke, No. 1 foundry and No. 1 soft, sil. 2.75 to 3.25	$50.92 to 51.87
Southern coke, No. 2 foundry, sil. 2.25 to 2.75	49.92 to 50.37
Southern foundry, sil. 1.75 to 2.25	48.67
Malleable not over 2.25 sil.	46.50
Basic	46.00
Low phos. (copper free)	57.00
Silvery, 7 per cent	63.32

Ferroalloys.—The market continues quiet in all of the ferroalloys. About 400 tons of resale spiegeleisen is being offered at $80, Cincinnati, but makers are adhering firmly to $85, furnace.

We quote 75 to 80 per cent ferromanganese, delivered, $176.80; 50 per cent ferrosilicon at $85, delivered; spiegeleisen, 18 to 22 per cent, $85 furnace.

Plates.—Generally speaking, the market is exceedingly dull. The leading interest, however, is receiving specifications in larger volume as well as an increasing number of inquiries from miscellaneous manufacturers. While railroad car buying is not progressing as fast as was anticipated, a large new inquiry has appeared calling for 5000 freight cars, including single and double sheathed box, gondola and hopper cars. The equipment will involve 50,000 tons of steel. Another confidential inquiry calls for repairs on 1000 hopper car bodies.

The mill quotation is 2.65c. to 3.50c., Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 3.78c. to 4.28c. for plates out of stock.

Structural Material.—The market continues dull and independents are able to make fairly prompt delivery, although the leading interest is receiving heavier specifications and more new inquiries than a few weeks ago. The latter also finds more of a disposition on the part of users to ask for fourth quarter contracts. It is to be noted, however, that little of this business emanates from the fabricators. Pending inquiries for fabricated steel include: Community school, Rochelle, Ill., N. S. Spencer, architect, Chicago, 100 tons. City of Chicago, breakwater south of Field museum, 150 tons. Recent lettings include:

Crossley Building, San Francisco, 350 tons, to Pacific Rolling Mill Co.

California Packing Corporation, Sacramento, 450 tons, to Dyer Brothers.

Elevator, Grand Forks, N. D., North Dakota Mill & Terminal Co., 135 tons, to unnamed fabricator.

Two highway spans, Hamlin County, S. D., 112 tons, to American Bridge Co.

The mill quotation is 2.45c. to 3.25c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 3.58c. to 4.08c. for materials out of warehouse.

Bars.—The situation in bars shows little change. Independent quotations on mild steel bars range from 3c. to 4c., Pittsburgh, and on heavier sizes fairly prompt delivery can be obtained. New bookings in bar iron and rail carbon steel bars are rather light.

Mill prices are: Mild steel bars, 2.46c. to 4c.; Pittsburgh taking a freight of 38c. per 100 lb.; common bar iron, 3.75c. to 4c., Chicago; rail carbon, 4c. mill.

Jobbers quote 3.48c. to 3.98c. for steel bars out of warehouse. The warehouse quotation on cold rolled steel bars is 5.90c. for rounds and 6.40c. for flats and squares, an extra of 15c. per 100 lb. applying to orders exceeding 1000 lb. and under 2000 lb. and an extra 35c. for orders up to 1000 lb. Jobbers quote hard and medium deformed steel bars at 4.63c. base.

Sheets.—Sheets are somewhat easier although independent prices are still far above the Steel Corporation level. Blue annealed is particularly soft and can be obtained fairly promptly at from 5.50c. to 6c., Pittsburgh base. Spot black commands about 8c. and black 9c. to 9.50c. Light gauges are still scarce.

Mill quotations are 4.35c. to 8c. for No. 28 black; 3.55c. to 6c. for No. 10 blue annealed, and 5.70c. to 9c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb. The lowest prices are those of March 21, 1919.

Jobbers quote: Chicago delivery out of stock, No. 10 blue annealed, 7.13c.; No. 28 black, 8.10c.; No. 28 galvanized, 9.60c.

Rail and Track Supplies.—Rails and accessories are notably in demand, and it is probable that the contracts which will be closed by the local rail mill will tax its capacity throughout 1921. There is also considerable inquiry for track fastenings for prompt shipment. The leading interest's new commitments in light rails are still about equal to shipments. A Western independent is now quoting railroad spikes at 4c. and track bolts at 5c., Pittsburgh.

Standard Bessemer rails, $45 to $55; open hearth rails, $47 to $57. Light rails, 2.45c. to 3.50c., f.o.b. makers' mills.

Standard railroad spikes, 3.55c. to 4c., Pittsburgh. Track bolts with square nuts, 4.60c. to 5c., Pittsburgh. Steel tie plates, 3c. to 4c. and steel angle bars, 2.75c. Pittsburgh and Chicago; tie plates, iron, 3.75c. to 4c.; f.o.b. makers' mills.

Wire Products.—Although production is steadily improving and shipments from the mills are growing better, the shortage of wire nails and fine wires is still acute. Western plants of the leading interest are operating at over 80 per cent of capacity, but this producer is as yet unable to take new business except on a replacement basis. For mill prices see Finished Iron and Steel, f.o.b. Pittsburgh, page 683.

Cast-Iron Pipe.—Manufacturers have increased the differentials added to the base price for smaller sizes. Thus 4-in. is quoted at $5 a ton more than 6-in., or at $84.10 per net ton, f.o.b. Chicago. The extra for Class A and gas pipe has been increased from $2 to $4. Effective Sept. 11, the leading interest will advance all sizes $4 a ton, making 4-in. water pipe, $88.10, Chicago, and 6-in. and larger, $83.10. The market continues quiet.

We quote per net ton f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $84.10; 6-in. and above, $79.10; class A and gas pipe, $4 extra.

Bolts and Nuts.—The advances announced by some of the Eastern manufacturers have not yet resulted in similar action by leading makers in this district. The market situation has shown little change, the excess of demand over supply still being marked. The railroads are pressing manufacturers hard for deliveries against contracts, but, as yet, have done little new buying. Many implement contracts will run out on Oct. 1, and renewals to cover fourth quarter are looked for. Some makers are behind on deliveries against existing contracts with agricultural machinery manufacturers. At present, new business emanates principally from jobbers. For mill prices see Finished Iron and Steel, f.o.b. Pittsburgh, page 683.

Jobbers quote structural rivets, 5.73c., boiler rivets, 5.83c.; machine bolts up to ⅞ x 4 in., 20 per cent off; larger sizes, 10 off; carriage bolts up to ⅞ x 6 in., 10 off; larger sizes, 5 off; hot pressed nuts, square tapped and hexagon tapped, list price plus 10; blank nuts, list price less 40; coach or lag screws, gimlet points, square heads, 30 per cent off. Quantity extras are unchanged.

Old Material.—After a period of activity in open-hearth steel, re-rolling rails, stove plate, grate bars and malleable, the market is quiet throughout and generous offerings by the railroads, as well as by dealers, have given some grades of scrap a weaker tone. Cast is notably weak as a result of curtailed foundry operations and the demand for malleable has fallen off following the withdrawal from the market of two prominent local consumers. Both the steel and bar iron mills are believed to have taken care of their needs for some time, while forge plants, because of reduced operations, are not adding to their stocks of scrap. It is believed that the market will receive its next impetus from railroad work which is expected to develop in volume some time this fall, perhaps not until after the presidential election. A few small inquiries already received from railroad equipment manufacturers are regarded as forerunners of larger buying. Railroad offerings include: the Louisville & Nashville, 8000 tons; the New York, Chicago & St. Louis, 2000 tons; the Union Pacific, 3000 tons; the Great Northern, 2000 tons; and the Erie, a blank list.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$36.00 to $37.00
Relaying rails	57.50 to 62.50
Car wheels	38.00 to 38.50
Steel rails, rerolling	39.00 to 40.00
Steel rails, less than 3 ft.	27.50 to 28.00
Heavy melting steel	26.00 to 26.50
Frogs, switches and guards, cut apart	26.00 to 26.50
Shoveling steel	25.00 to 25.50
Low phos. heavy melting steel	30.00 to 30.50
Drop forge flashings	21.50 to 22.00

Per Net Ton

Iron angles and splice bars	$33.50 to $34.00
Steel angle bars	25.00 to 25.50
Iron arch bars and transoms	34.50 to 35.00
Iron car axles	42.50 to 43.00
Steel car axles	35.50 to 36.00
No. 1 busheling	20.50 to 21.00
No. 2 busheling	12.50 to 13.00
Cut forge	24.00 to 24.50
Pipes and flues	17.00 to 17.50
No. 1 railroad wrought	24.50 to 25.00
No. 2 railroad wrought	24.00 to 24.50
Steel knuckles and couplers	25.50 to 26.00
Coil springs	26.50 to 27.00
No. 1 cast	35.00 to 35.50
Boiler punchings	26.50 to 27.00
Locomotive tires, smooth	24.00 to 24.50
Machine shop turnings	9.50 to 10.00
Cast borings	13.00 to 13.50
Stove plate	28.50 to 29.00
Grate bars	28.50 to 29.00
Brake shoes	25.50 to 26.00
Railroad malleable	28.50 to 29.00
Agricultural malleable	28.00 to 28.50
Country mixed	17.00 to 18.00

Joseph Beal & Co., Boston, new and used machine tools, are occupying new quarters at 465-471 Atlantic Avenue, ground floor. The building is five stories, has been thoroughly renovated and will be occupied entire by the company as soon as certain leases expire. David Wallace, with the Cutter, Wood Supply Co., Boston, for sixteen years, is in charge of the small tool department. The company will maintain its head offices and salesrooms at 23 Purchase Street, for a year, at least. Charles F. Gilman, general manager, will continue his headquarters there.

Boston

BOSTON, Sept. 7.

Pig Iron.—The Boston & Maine Railroad is still embargoed, but other New England roads are open and furnaces, especially Virginia and Alabama, are making heavy shipments. These shipments have had a tendency to narrow down the demand for 1920 iron, the buying during the past week being confined very largely to car lots of spot iron. The market, therefore, is quieter than it has been before in some time. One Alabama furnace sold 1000 tons, silicon 2.25 to 2.75, prompt shipment, at $43.25 furnace, to a Taunton, Mass., foundry; an additional 300 tons, silicon 2.75 to 3.25, to a South Boston melter, making a total of 1000 within the past fortnight, at $44.25 furnace; and 100 ton lots to Taunton, Mass., Portland, Me., and Hartford, Conn., foundries at $42, furnace base, its total bookings being 1600 tons. Another Alabama furnace sold 500 tons, silicon 2.25 to 2.75, including 150 tons for first quarter delivery, in small lots, at $42 furnace base. A sale of 200 tons No. 2 X Buffalo, prompt shipment, resale iron, at $49.25 furnace base, the first in many weeks, is reported, and one of 300 tons Lake charcoal iron at $55 furnace, shipment over remainder of the year, but aside from this business, very little has been accomplished. The total sales for the week will not run above 4000 tons. Delivered pig iron prices follow:

East. Pa., sil. 2.25 to 2.75	$55.31 to $60.00
East. Pa., sil. 1.75 to 2.25	54.06 to 58.06
Buffalo, sil. 2.25 to 2.75	55.96 to 56.71
Buffalo, sil. 1.75 to 2.25	54.71 to 55.46
Virginia, sil. 2.75 to 3.25	59.27 to 61.27
Virginia, sil. 2.25 to 2.75	57.52 to 59.52
Virginia, sil. 1.75 to 2.25	56.27 to 58.27
Alabama, sil. 2.75 to 3.25	51.91 to 55.67
Alabama, sil. 2.25 to 2.75	50.91 to 53.92
Alabama, sil. 1.75 to 2.25	49.66 to 52.67

Coke.—The New England Coal & Coke Co. continues to quote foundry coke at $23.70 delivered where the freight rate does not exceed $3.40. The company has started an additional battery of 50 ovens, making 400 now in operation, and has greatly increased shipments. The Providence Gas Co. also has materially increased its production and shipments and is delivering on old contract prices.

Ferromanganese.—A small tonnage of ferromanganese has been taken by one foundry at $225 per ton f.o.b. shipping point.

Finished Material.—Going business in structural and plates is confined to small tonnages, which in the aggregate make a fairly good showing. The bulk of bookings of shapes is at 3.10c. f.o.b. Pittsburgh. The Maine Central Railroad is asking bids on two bridges, involving about 100 tons. Some plate business has been taken the past week at 4c. Pittsburgh base, but more at 3.25c. and 3.50c. Small bars command better than 4c., but consumers will not pay more than 3.75c. for large. More local warehouses are quoting iron and steel on a 6c. base than heretofore. Local jobbing quotations on machine bolts with h.p. and c. and t. nuts, common carriage bolts and h.p. and c. p. c. and t. nuts have been advanced 10 per cent. Stocks of ⅝-in. and 1¼-in. bolts are slightly larger, but broadly speaking those of bolts and nuts are badly broken. Jobbers quote wire nails at $4.75 per keg base and cut nails at $8.25. Pipe and Stillson wrenches have been advanced 5 per cent to 47½ per cent discount.

Jobbers quote: Soft steel bars, $5.50 to $6.50 per 100 lb. base; flats, $6.50 to $6.85; concrete bars, $6 to $6.50; tire steel, $7 to $7.50; spring steel, open hearth, $11; crucible, $16; steel bands, $8 to $8.25; steel hoops, $9; toe calk steel, $8; cold-rolled steel, $10 to $10.50; structural, $6 to $6.50; plates, $6.50; No. 10 blue annealed sheets, $9; No. 28 black sheets, $9.15; No. 28 galvanized, $10.50; refined iron, $5.50 to $8; best refined, $7 to $7.50; Wayne, $8.50; band iron, $8; hoop iron, $9; Norway iron, $20.

Old Material.—The market is more active than it was at last reports and prices, as a rule, are strong. The market on heavy melting steel for Pittsburgh mill account is off 50c. at $21.50 f.o.b. shipping point inasmuch as their requirements are fairly well covered for the

time being. Local buying of steel for export has resumed at around $22 delivered dock, about 4000 tons being involved. There has been another flurry of buying and prices in the machinery cast market. One dealer sold 150 tons No. 2 cast at $42 delivered, the first sale reported in some time. Stove plate is in good demand and light supply. The American Brake-Shoe & Foundry Co. continues in the market for such material. A few cars of railroad wrought have been bought the past week at $29 for eastern Pennsylvania mill account, but the market for yard wrought is at a standstill, holders waiting for the horseshoe manufacturers to buy. The better kinds of borings and turnings are quoted at slightly higher prices, but a very small tonnage has changed hands. A Connecticut consumer bought 150 tons car wheels at $38 f.o.b. shipping point. Car axles are difficult to obtain, a Portland, Me., mill absorbing about everything offered. The Boston & Maine Railroad last week sold 1000 tons mixed material at around $18.60. Dealers' prices on old material follow:

No. 1 heavy melting steel	$18.00 to $21.50
No. 1 railroad wrought	28.00 to 29.00
No. 1 yard wrought	22.00 to 23.00
Wrought pipe (1-in. in diameter, over 2 ft. long)	18.50 to 19.00
Machine shop turnings	14.00 to 14.50
Cast iron borings	17.00 to 18.00
Heavy axle turnings	15.00 to 16.00
Blast furnace borings and turnings	13.00 to 14.00
Forged scrap	12.00 to 13.00
Bundled skeleton	12.00 to 13.00
Street car axles	31.00 to 32.00
Car wheels	37.00 to 38.00
Machinery cast	43.00 to 44.00
No. 2 cast	37.00 to 38.00
Stove plate	27.00 to 28.00
Railroad malleable	28.00 to 29.00
Rerolling rails	32.00 to 33.00

St. Louis

ST. LOUIS., Sept. 6.

Pig Iron.—The pig iron market has been rather quiet with only a few sales of specially wanted material for prompt delivery. Both buyers and sellers are continuing to halt somewhat on transactions, especially the latter because of uncertainties as to costs. Buyers, according to the best indications here, would buy more freely if there were more definiteness as to prices and deliveries, as foundries and other consumers are operating freely, especially the commercial castings foundries which are utilizing the full obtainable number of molders.

Coke.—Some coke was reported sold the past week for immediate delivery at $79 ovens, but only a small quantity, this making with the freight rate of $5.05 from the Connellsville district, the total cost of $24.05 delivered St. Louis. No future contracts are being reported.

Finished Iron and Steel.—The movement in finished products is about the same as for some time past, very little improvement being noted in the deliveries. No large contracts are being placed and material for building uses is not particularly needed in this vicinity because of existing differences between the contractors and the unions which has put a stop to a considerable quantity of building that might otherwise go on in spite of high costs. Movement out of warehouse is up to available supplies and receipts with very little improvement, if any, in the arrivals of material.

We quote for stock out of warehouse as follows: Soft steel bars, 4.07½c.; iron bars, 4.50c.; structural material, 4.17½c.; tank plates, 4.37½c.; No. 10 blue annealed sheets, 7.27½c.; No. 28 black sheets, cold rolled, one pass, 8.20c.; No. 28 galvanized, black sheet gage, 9.70c.

Old Material.—The scrap market brightened up some during the week and considerable buying was done by the larger dealers and some consumers. The steel mills and rolling mills were in the market to some extent and prices were held firmly for the most part. Dealers generally look for a good market for the next 60 to 90 days at least, according to present conditions and are inclined to be optimistic. Lists out during the week included 2500 tons from the Pennsylvania and 1200 tons from the Missouri, Kansas & Texas.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district, as follows:

Per Gross Ton	
Old iron rails	$32.50 to $33.00
Old steel rails, rerolling	35.00 to 35.50
Old steel rails, less than 3 ft.	25.00 to 25.50
Relaying rails, standard sections subject to inspection	50.00 to 55.00
Old car wheels	36.00 to 36.50
No. 1 railroad heavy melting steel	24.00 to 24.50
Heavy shoveling steel	22.00 to 22.50
Ordinary shoveling steel	21.50 to 22.00
Frogs, switches and guards, cut apart	26.00 to 26.50
Ordinary bundled sheets	12.00 to 12.50
Per Net Ton	
Heavy axles and tire turnings	$15.00 to $15.50
Iron angle bars	31.00 to 31.50
Steel angle bars	23.00 to 23.50
Iron car axles	40.50 to 41.00
Steel car axles	34.00 to 34.50
Wrought arch bars and transoms	33.00 to 33.50
No. 1 railroad wrought	25.00 to 25.50
No. 2 railroad wrought	23.00 to 23.50
Railroad springs	24.00 to 24.50
Steel couplers and knuckles	24.00 to 24.50
Locomotive tires, 42 in. and over, smooth inside	21.00 to 21.50
Cast-iron borings	14.50 to 15.00
No. 1 busheling	20.00 to 20.50
No. 1 boiler, cut to sheets and rings	17.00 to 17.50
No. 1 railroad cast	35.00 to 35.50
Stove plate and light cast	26.50 to 27.00
Railroad malleable	27.00 to 27.50
Agricultural malleable	25.50 to 26.00
Pipes and flues	17.50 to 18.00
Heavy railroad sheet and tank	15.00 to 15.50
Railroad grate bars	26.50 to 27.00
Machine-shop turnings	10.50 to 11.00
Country mixed	20.50 to 21.00
Uncut railroad mixed	21.50 to 22.00
Horseshoes	25.50 to 26.00
Brake shoes	24.00 to 24.50

Buffalo

BUFFALO, Sept. 7.

Pig Iron.—There is not much sales activity and furnaces are content to pursue operation quietly without making any aggressive efforts to sell. Most furnaces will have considerable delayed tonnage to carry over into the first half of next year and now that they have an opportunity to make up for lost time, they are making the most of it. Supplies of coke are better and operation is climbing steadily. Two thousand tons of foundry iron of all grades were sold during the past week by one maker. This iron was practically all sold at the $50 base. Sixteen carloads of basic iron were sold by another concern at a price somewhat under present market quotations. Future basic sales by this concern will be at present prices. There is some activity in malleable inquiry but no sales so far as can be learned. Labor is more plentiful and in this, some makers see the earmarks of a trend which may eventually bring about a return to normal conditions and prices in the iron-making business.

We quote f.o.b. Buffalo:

No. 1 foundry, 2.75 to 3.25 sil.	$53.00
No. 2 X foundry, 2.25 to 2.75 sil.	51.25
No. 2 plain, 1.75 to 2.25 sil.	50.00
Basic	48.50
Malleable	51.25
Lake Superior charcoal	$58.00 to 60.00

Warehouse Business.—Higher freight rates have affected the prices of materials and there has been a revision, the majority of the changes being the difference in the new rates from Pittsburgh to Buffalo. Sheets are still very scarce. Shapes are being eagerly sought, particularly large beams. One recent inquiry for beams of considerable volume remained in abeyance for two weeks or more while the purchaser was testing out all sources of supply. The purchase was finally made in the Buffalo market at current prices. Bars are in strong demand.

Warehouse prices f.o.b. Buffalo are: Steel bars, 4.65; shapes, 4.50; plates, 4.70; No. 10 blue annealed, 7.15; No. 28 black sheets, 9.10; No. 28 galvanized sheets, 10.60; hoops, 6.60.

Finished Iron and Steel.—Plates are showing a little more activity with some business being taken. Mills have space for plenty of plate tonnage and this is reflected in the short-time deliveries being promised. There have been several inquiries for 100 tons quoted on and one inquiry for over 200 tons. Delivery on this last was promised within two weeks. Bar inquiry is very fair with the most eager demand for smaller sizes.

Structural and cold finished material are in strong demand. Sales agencies report more suspension of sheet contracts asked by automobile companies. There is the same heavy inquiry for nails and wire products noticeable. Mills are operating very well and the opinion is expressed in some quarters that there is clearer sailing ahead. The car supply is variously reported as about the same and considerably better. One mill which uses railroad shipping facilities extensively reports that the car situation is vastly improved. If mills are successful in present negotiations to secure the use of 42-inch side cars, the conditions will be still more favorable.

Old Material.—There are few transactions being made with mills as purchasers, though dealers are actively endeavoring to fill old orders, and are buying considerable material. There is a feeling of uneasiness among more cautious dealers. They point out that most transactions being made now call for 30 to 60-day delivery and they are rather inclined to fear a depression after that. Heavy melting steel is being bought by dealers now at prices above the present quotation to fill orders taken at prices below present quotations. They are anxious to fill these orders before possible new advances.

We quote dealers' asking prices per gross ton, f.o.b. Buffalo as follows:

Heavy melting steel, regular grades	$26.00 to $27.00
Hydraulic compressed	23.50 to 24.00
Low phos., 0.04 and under	33.00 to 34.00
No. 1 railroad wrought	31.50 to 32.50
No. 1 machinery cast	40.00 to 41.00
Iron and steel axles	42.00 to 43.00
Car wheels	40.00 to 41.00
Railroad malleable	32.00 to 32.50
Machine-shop turnings	15.00 to 16.00
Heavy axle turnings	19.50 to 20.50
Clean cast borings	21.00 to 22.00
Iron rails	31.00 to 32.00
Locomotive grate bars	25.00 to 26.00
Stove plate	31.50 to 32.50
Wrought pipe	20.50 to 21.50
No. 1 busheling	19.50 to 20.50
Bundled sheet stampings	16.50 to 17.50

Birmingham

BIRMINGHAM, ALA., Sept. 7.

Pig Iron.—There was a perceptible slowing up in the Birmingham iron market as the month of August entered. The peak was reached about Aug. 20 and a slight subsidence set in at that time, but at least one additional week of really big business was done by one and probably by another large concern. The July and August selling was tremendous. September ushered in a hiatus. The Southern consumers have failed to take much interest in 1921 requirements both on account of a natural serenity following a prolonged period of uniform prices and on time delivery and because the operators as a rule have not urged them to book for 1921. The sanitary pipe interests have been especially slow in taking on forward iron and stove concerns are also listed among the dilatory. Indications point to an easing up of the situation in the North and West owing to reception of local iron with greater regularity. Inquiries from north of the Ohio have not been as brisk during the past week as prior to that period. The great purchasing wave extending over Ohio, Illinois, Indiana and adjacent states and into New England lasted the entire two months, producing probably the greatest business done there by Birmingham furnaces in a long period. The operators who remain firm in the 4 per cent silicon differentials credit a portion of the business to the reductions in silicon differentials offered by one large interest. No others admit following that example. One maker sold 500 tons for Middle Western delivery, 3.25 to 3.75 silicon, at $47.25, and 2400 tons more in scattered lots at the old differentials.

We quote per gross ton f.o.b. Birmingham district furnaces, the Tennessee company excepted, as follows:

Foundry, sil. 1.75 to 2.25	$42.00
Basic	41.00
Charcoal	$58.00 to 60.00

Cast Iron Pipe.—Sanitary pipe concerns admit a very perceptible slowing down in new business. The average plant seems to be booked for 30 to 60 days ahead, some few a little longer. Some report cancellations. Shops have not slowed down operations, but there is some anxiety as to the future owing to the small demand from the city trade. Water and gas pipe orders come in with satisfactory volume. Quotations remain at $73 for 4 in. and $70 for 6 in. and upwards.

Coal and Coke.—The local mine workers' union of Alabama called a general strike Sept. 7, following a guerilla strike of several months affecting domestic coal producers. The strike is strictly for recognition of the union. Operators stand pat for the open shop that has prevailed since 1908. Foundry coke sells at $13.50 to $15. Spot and furnace coke brings $10 and $11. A little is going to the Southwest, but local consumption cares for the vast bulk of production.

Old Material.—The scrap market has been continuously active for about three weeks. Buyers of heavy melting steel have taken on large stocks at from $23 to $24 and are trying to secure more at the same prices, but some dealers are holding out for higher levels.

We quote per gross ton f.o.b. Birmingham district yards, prices to consumers, as follows:

Old steel rails	$23.50 to $24.50
No. 1 steel	22.50 to 23.50
No. 1 cast	35.00 to 36.00
Car wheels	34.00 to 35.00
Tramcar wheels	33.00 to 34.00
No. 1 wrought	28.00 to 29.00
Stove plate	26.00 to 27.00
Cast iron borings	13.00 to 14.00
Machine shop turnings	13.00 to 14.00

New York

NEW YORK, Sept. 7.

Pig Iron.—The market is extremely dull. The one inquiry for fair tonnage pending last week, involving 5000 to 8000 tons of No. 2 and No. 3 for delivery over the first half, has not developed into an order. It is understood that this inquiry has brought out some quotations slightly lower than those usually quoted and that the placing of the tonnage depends upon a contract for castings being taken. There is very little iron available for immediate delivery, and for this delivery $52 seems to be the minimum at eastern Pennsylvania furnaces. There is still uncertainty as to the freight rate on Virginia iron. The traffic manager of one large agency states it as his opinion that the rates in the Eastern region extending from the Northeastern corner of the United States to Norfolk are advanced 40 per cent, the Southern region embracing that part of the United States lying south of the main line of the Norfolk & Western from Norfolk to Kenova, then south of the Chesapeake & Ohio to Cincinnati; south of the Ohio River to Cairo and east of the Mississippi to New Orleans and the Delta. He states that the Southern and Western boundaries of the Eastern region are constructed by following the main line of the Norfolk & Western from Norfolk to Kenova, W. Va., the Chesapeake & Ohio to Cincinnati and the Ohio River to Cairo, passing up the Mississippi River to the mouth of the Illinois; thence up the Illinois River to Pekin, Ill., thence a line south and east of the Atchison, Topeka & Santa Fe from Pekin via Joliet and Streator to Chicago; thence including the southern peninsula of Michigan and following the international boundary to the seaboard. However, the controversy as to whether the advance on Virginia iron is 40 or 33 1/3 per cent has not been officially decided.

We quote for delivery in the New York district as follows, the higher quotations being for prompt delivery and the lower for first half of 1920, except on Virginia iron, on which the two quotations are due to freight rates, one being at 40 per cent advance and the other at 33⅓ per cent:

East. Pa., No. 1 fdy., sil. 2.75 to 3.25	$55.52 to $57.52
East. Pa., No. 2X fdy., sil. 2.25 to 2.75	53.77 to 55.77
East. Pa., No. 2 fdy., sil. 1.75 to 2.25	52.52 to 54.52
Buffalo, sil. 1.75 to 2.25	54.46
No. 2 Virginia, sil. 1.75 to 2.25	55.87 to 56.16

Ferroalloys.—Demand for ferromanganese is extremely light, and it is probable that the recent reduction in quotations for both the domestic and foreign product has caused consumers to await developments. A large Pittsburgh cousumer is understood to have bought 2000 tons at the time of the reduction

two weeks ago at $170, it being stated that part of this was British alloy and part American. It is also rumored, but not confirmed, that one sale has been made for early delivery at below $170, delivered, the material involved being probably resale alloy. In the absence of any active business the market is quotable at $170, seaboard, for British alloy for delivery into June, 1921, and at $170, seaboard, as a base for domestic alloy for delivery in the last half. Importations in July were 2448 tons, bringing the total to Aug. 1, this year, to 23,711 tons, against 16,393 a year ago. The spiegeleisen market is inactive but firm at $82.50 to $85, furnace, for 19 to 21 per cent alloy, with the lower grade quoted at $80, furnace. The tendency of the manganese ore market is lower, consumers being unwilling to pay more than 55c. per unit, seaboard, while offerings are not less than 65c. per unit. No sales are recorded. The imports in July were only 18,447 tons, bringing the total to Aug. 1 to 234,989 tons, as compared with 241,570 tons to Aug. 1, 1919. A large Eastern producer of ferroalloys is producing silico-manganese containing 15 to 20 per cent silicon and 45 to 55 per cent manganese, which it is understood is quoted at $200 to $225 per ton, furnace. Alloy of a similar nature has been offered from Italy at a price, delivered seaboard, close to the foregoing figures. The 50 per cent ferrosilicon market is quiet at $80 to $85 per ton, delivered.

Finished Iron and Steel.—Signs point to something of a test of strength between producer and consumer. The one, faced by higher manufacturing costs through the freight rate increase, is maintaining prices in spite of a falling off in buying. The unsatisfied demand expected from the other does not take concrete form. Steel makers of plates and shapes, which are admittedly easy items, are comfortably off so far as September and October rollings go, and believe the needs will be asserted soon enough to keep mills busy, particularly when railroad buying assumes larger proportions. The consumers are attempting to bear the market, but with little success except in the case of offerings particularly attractive to a given mill. The result is that plates are commonly quoted at 3.50c., Pittsburgh, while buyers consider the market 3.25c. Structural steel is put 3.10c. to 3.25c. There is no change in the steel bar situation, in which no one seems to doubt that large tonnages of the smaller sizes could be booked readily at 3.75c., 4c. and 4.25c. In steel rails, some roads have been negotiating to get mill positions in 1921, but rail makers have not yet apparently decided on the unit price; both sides are showing some indifference. More structural work came to light than has been the case for a number of weeks. The American Bridge Co. has closed for a good total, including 900 tons for the Pennsylvania Sugar Co., Philadelphia; 200 tons for bridge work for the Pennsylvania Railroad; 2300 tons for the Fifth Avenue Hospital, New York, and 200 tons for bridges for the Boston & Maine. The Canadian Bridge Corporation, Ltd., will supply 900 tons for an international bridge at Madawaska, and the Levering & Garrigues Co. has been awarded 4500 tons for the S. W. Strauss bank on Fifth Avenue. New work which has appeared includes 500 tons of caisson work for the interstate tunnel across the Hudson; 1200 tons of bridge and other repair work for the New York Central; 500 tons for a shop at Forty-eighth Street and Lenox Avenue for the Rapid Transit Construction Co., in which the Bainbridge Construction Co. is the low bidder for the general contract, and an addition to the Hotel Plaza, New York, involving 5000 tons, which is regarded as an early likelihood. On Sept. 15 bids will be taken on 2500 tons for the Piscataqua River bridge at Kittery, Me., involving three 300-ft. spans, one of which will be a bascule lift.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.73c. to 4.38c.; shapes, 2.83c. to 3.63c.; plates, 3.03c. to 3.88c., the minimum prices being for indefinite delivery and the highest prices for delivery in a few weeks; bar iron, flats, wider than 6 in., 5.38c., with half extras; light rounds, squares and flats, 5.88c. with full extras, and other sizes, 4.88c., with half extras.

High Speed Steel.—The market continues dull and some cancellations are reported. Domestic producers continue to quote 18 per cent tungsten high speed steel at $1.25 per lb. New York with large contracts at a little less than this figure.

Cast Iron Pipe.—Possibly the Labor Day holiday has been responsible for the quietness. It is expected that the recently raised differential in price between the larger and smaller sizes will slacken the demand for the smaller. It is explained that manufacturers suddenly realized that, while prices of pipe had been raised continually in the past few months, the differential had remained the same when it should have increased proportionately. We now quote, f.o.b. New York: 6-in. and larger, $77.22; 4-in., $87.22; 3-in., $97.22.

Old Material.—In most instances, dealers are paying the increase in freight rates, disposing of their scrap at a trifle lower figure. Practically the only changes in price since a week ago are a slight raise in borings and turnings and a decrease in forge fire. There is very little buying, consumers having adopted a waiting attitude. The demand for cast scrap is better.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$22.00 to $22.50
Rerolling rails	36.50 to 37.00
Relaying rails, nominal	54.00 to 55.00
Steel car axles	39.00 to 40.00
Iron car axles	44.00 to 45.00
No. 1 railroad wrought	30.00 to 31.00
Wrought iron track	23.50 to 24.00
Forge fire	13.00 to 14.00
No. 1 yard wrought long	26.00 to 27.00
Light iron	9.00 to 10.00
Cast borings (clean)	18.00 to 18.50
Machine-shop turnings	15.50 to 16.00
Mixed borings and turnings	14.00 to 14.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	19.50 to 20.00
Stove plate	26.00 to 27.00
Locomotive grate bars	28.00 to 28.50
Malleable cast (railroad)	28.00 to 29.00
Old car wheels	39.00 to 40.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton:

No. 1 machinery cast	$42.50 to $43.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	42.50 to 43.50
No. 1 heavy cast, not cupola size	30.00 to 31.00
No. 2 cast (radiators, cast boilers, etc.)	29.00 to 30.00

Philadelphia

PHILADELPHIA, Sept. 7.

The iron and steel market is drifting without any apparent trend. The waiting attitude of buyers has been more marked in the past week because of the holiday. The continued lack of demand for plates and shapes leaves makers in a quandary as to what the next few months will bring forth. Some of the plate manufacturers are disturbed by the number of sales which have been made at 3.25c., Pittsburgh. One Eastern plate maker is holding for 4c., while others say they will not quote below 3.50c., claiming that sales at prices below that figure are unprofitable with present high production costs. Rerolling billets and slabs are slightly weak, and might be obtained below $60, Pittsburgh, but other steel products, notably bars, sheets and wire products, are firm at the prices which have been quoted for some months past, and the supply of the latter products still falls considerably short of requirements. Nevertheless, even in these products new inquiries have dropped off in the past few weeks. A pronounced scarcity of all grades of pig iron continues, but buying is confined almost wholly to small lots for early shipment, a sale of 4000 tons of standard low phosphorus iron and one of 2000 tons of basic being the largest iron transactions of the week. One Eastern consumer of basic is in sore straits for iron, though having a considerable tonnage under contract. This buyer has just closed for the 2000 tons mentioned above at $50, Eastern furnace. The scrap market is not very active, but an upward trend of prices is indicated by each new transaction. A noteworthy improvement in railroad car movement is in evidence, this being partly due to the release of cars which, but for the strike of miners, would go to the anthracite coal regions of Pennsylvania.

Pig Iron.—The scarcity of basic iron is so pronounced that one Eastern consumer has had difficulty in pro-

curing any tonnage for early shipment. One lot of 2000 tons was bought today at $50, furnace, but most of the basic producers in this district are sold up until the first of the year or later. The largest transaction of the week was a sale of 4000 tons of standard low phosphorus iron to a New England wire manufacturer at $60, furnace, for fourth quarter shipment. The demand for foundry iron is mostly for small lots for prompt shipment. Consumers who have inquired recently for lots aggregating several thousand tons for first quarter and first half seem in no haste to buy. Sellers are not pressing buyers to contract for next year. Spot foundry iron is being sold at about the following range of prices f.o.b. Eastern Pennsylvania furnaces: 1.75 to 2.25 silicon, $51 to $52; 2.25 to 2.75 per cent silicon, $52.25 to $52.50; 2.75 to 3.25 per cent silicon, $54 to $60. Virginia iron continues at $50, furnace, but very little is available for this year's delivery.

The following quotations are for iron delivered in consumers' yards in Philadelphia or vicinity, except those for low phosphorus iron, which are f.o.b. furnace:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$52.26 to $52.54
East Pa. No. 2X, 2.25 to 2.75 sil.	53.51 to 53.79
Virginia No. 2 plain, 1.75 to 2.25 sil.	55.47
Virginia No. 2X, 2.25 to 2.75 sil.	56.72
Basic deliv. Eastern Pa.	51.26 to 51.52
Gray forge (nominal)	47.10 to 48.50
Standard low phos. (f.o.b. furnace)	60.00
Malleable	57.71
Copper bearing low phos. (f.o.b. furnace)	57.00

Ferroalloys.—Sales of ferromanganese in small lots have been made at the price recently established by British makers, namely, $170, c.i.f. Atlantic seaboard, which American makers are meeting. There are reports that this price has been shaded a few dollars. There is little demand in this market for spiegeleisen, which is held at $80 to $85, furnace.

Semi-Finished Steel.—Open-hearth rerolling billets and slabs are easily obtainable at $60, Pittsburgh, and even this price might be shaded on desirable orders. Forging billets are somewhat firmer than rerolling quality, being quoted at $75, Pittsburgh.

Plates.—Notwithstanding numerous sales of plates in the past few weeks at 3.25c., Pittsburgh, some makers are unwilling to go below 3.50c., claiming that high production costs make such low-priced business unprofitable. One Eastern maker is holding for 4c. The plate market is weak, and there is a lack of specifications, which leaves a few mills with relatively little business on their books. With no important railroad buying in sight, the outlook for the next few months is decidedly uncertain. We note a sale of 1000 tons of ship steel for export at 3.25c., Pittsburgh, with 10c. Lloyd's extra added. It is reported here that 3.25c., Pittsburgh, has been shaded on domestic business, but this is not confirmed. We quote sheared plates, ¼ in. and heavier, at 3.25c. to 3.50c., Pittsburgh, with freight rate of 35c. per 100 lb. to Philadelphia.

Structural Material.—The market is weak, and plain material is now more easily obtained at prices ranging from 3.10c. to 3.25c., Pittsburgh.

Bars.—New inquiry for bars is in lighter volume, but mills are well sold up and could doubtless find buyers if they had tonnage to offer for early shipment. On small sizes, 4.25c., Pittsburgh, and upward can be had from buyers, while larger sizes have been sold at 4c., Pittsburgh. We note a sale of 1000 tons of spring steel on a 4c., base, with usual extras. Bar iron is still quoted at 4.50c., base, Pittsburgh, and demand is fairly good.

Sheets.—One inquiry calls for 2000 tons of blue annealed sheets for powder cans and another calls for 1000 tons for a stove works. One Eastern maker has practically nothing to sell for this year, while another, with some free tonnage, is quoting 6.50c., Pittsburgh, on No. 10 blue annealed.

Old Material.—No sales of importance are reported, but on small transactions an upward trend of prices is in evidence, this applying particularly to yard wrought, forge fire and skeleton, borings and turnings and stove plate. There is no activity in steel scrap. We quote for delivery at customers' works in this district as follows:

No. 1 heavy melting steel	$26.50 to $27.00
Steel rails rerolling	39.00 to 40.00
No. 1 low phos., heavy 0.04 and under	34.00 to 35.00
Car wheels	42.00 to 43.00
No. 1 railroad wrought	33.00 to 34.00
No. 1 yard wrought	29.00 to 30.00
No. 1 forge fire	18.00 to 19.00
Bundled skeleton	18.00 to 19.00
No. 1 busheling	20.00 to 21.00
No. 2 busheling	17.00 to 18.00
Turnings (short shoveling grade for blast furnace use)	19.00 to 20.00
Mixed borings and turnings (for blast furnace use)	18.00 to 19.00
Machine-shop turnings (for rolling mill and steel works use)	20.00 to 21.00
Heavy axle turnings (or equivalent)	21.00 to 22.00
Cast borings (for rolling mills)	23.50 to 24.00
Cast borings (for chemical plants)	24.00 to 25.00
No. 1 cast	40.00 to 42.00
Railroad grate bars	30.00 to 31.00
Stove plate (for steel plant use)	28.00 to 29.00
Railroad malleable	28.00 to 29.00
Wrought iron and soft steel pipes and tubes (new specifications)	24.00 to 25.00
Iron car axles	45.00 to 46.00
Steel car axles	42.00 to 44.00

Cincinnati

CINCINNATI, Sept. 7.

Pig Iron.—The market remains extremely dull and aggregate sales during the past seven days have been the smallest of any week this year. Inquiry is very light, the largest reported being for 500 tons for shipment during the last quarter. Resale iron is still being offered, chiefly from melters who had been running almost completely on automobile work. The melt of iron in this territory, however, has shown no appreciable diminution, the falling off in automobile work being offset by increased production by stove and implement manufacturers, who are now able to secure sufficient labor for the first time in many months. Very little interest is being shown in first half iron, and furnaces in the North are not soliciting business. In the South, at least two interests continue to quote for this delivery, and one of these is reported to have sold over 100,000 tons during July and August. Prices remain firm, Northern iron for nearby delivery being quoted up to $50, and for first half of next year $46 to $47 are the prevailing prices. On Southern iron, $42 is still being quoted by the largest producers for all deliveries. One Southern furnace, however, disposed of about 1500 tons last week at $43, part of this in this territory. We note a sale of 500 tons of Southern iron for nearby delivery at $43, Birmingham, and one 300-ton sale of Northern iron for first quarter at $47, Ohio furnace. Sales, however, mostly consisted of carload lots and up to 150 tons. Collinwood furnace, of the Tennessee Valley Iron & Railroad Co., with a capacity of 50 tons of warm blast charcoal iron per day, was blown in the last of August.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base price)	$46.50 to $47.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	47.75 to 48.75
Ohio silvery, 8 per cent sil.	62.52
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	48.52 to 49.52
Basic Northern	48.52
Malleable	48.52 to 49.52

Finished Materials.—The demand for steel, with the exception of shapes and plates, is still active. There is a particularly heavy demand for assorted track spikes from mining companies, and warehouse stocks have been cleaned out. Bolts and nuts are also active, particularly in the smaller sizes. With improving transportation conditions, better shipments of pipe are being received, and the acute shortage which prevailed in this territory for many weeks has been relieved to a great extent. There is a strong demand for steel sheets, bars, and wire products, and warehouse stocks are very low. Jobbers, however, take a very hopeful view of the situation, as during the past two weeks shipments from mills have improved to such an extent that they are now enabled to give their customers much better service. We note a sale of a small tonnage of steel bars at 4.25c., Pittsburgh, but this can not be

taken as a representative quotation, as these bars will be rolled on a high cost mill. Quotations on bars by independents range from 3.50 to 4c., the former price being made for very indefinite delivery, while the latter is quoted for three to four months. On sheets, mill prices range from 5.50c. to 8.75c. for No. 28 black, and 7.50c. to 9.50c. for No. 28 galvanized. No structural lettings of any consequence are reported. No advances have been made in warehouse prices to cover the additional freight charges, jobbers reporting that there seems to be a great difference of opinion among railroads as to what the new rates will amount to. The matter will not be definitely settled until the new tariffs are completed. For this reason, we quote, from jobbers' stocks, the same prices as ruling for some weeks:

Iron and steel bars, 5c. to 6c.; structural shapes, 4.50c.; plates, 4.50c.; cold rolled shafting, 6.25c.; steel bands, 6.50c.; No. 10 blue annealed sheets, 7.50c.; No. 28 black sheets, 9 to 10c.; No. 28 galvanized sheets, 10c. to 11c; wire nails, $4.50 per keg base.

Coke.—The coke market is very dull and shows a softer tendency. Prompt Connellsville furnace coke is now quoted at $17 to $17.50, ovens, and foundry from $18 to $18.50. Wise County furnace is being offered at $16.50 to $17.50 with foundry $17.50 to $18. New River foundry is available at $19, ovens.

Old Material.—While movement of stocks continues to improve, the demand has fallen off and the scrap market is quieter than for several weeks. Buying of heavy melting steel, which had been very active from the Pittsburgh district, slackened off greatly with the withdrawal of the leading interest from the market. Some local selling is being indulged in, but this is confined to small tonnage of cast scrap. Prices are unchanged.

We quote dealers' buying prices:

Per Gross Ton	
Bundled sheets	$14.00 to $15.00
Old iron rails	27.00 to 28.00
Relaying rails, 50 lb. and up	50.00 to 51.00
Rerolling steel rails	32.00 to 33.00
Heavy melting steel	23.00 to 24.00
Steel rails for melting	24.00 to 25.00
Car wheels	36.00 to 37.00
Per Net Ton	
No. 1 railroad wrought	$25.00 to $26.00
Cast borings	11.50 to 12.00
Steel turnings	10.00 to 10.50
Railroad cast	32.00 to 33.00
No. 1 machinery	35.00 to 36.00
Burnt scrap	22.00 to 23.00
Iron axles	36.50 to 37.00
Locomotive tires (smooth inside)	24.50 to 25.50
Pipes and flues	16.00 to 16.50
Malleable cast	24.00 to 24.50
Railroad tank and sheet	16.00 to 16.50

Cleveland

CLEVELAND, Sept. 7.

Iron Ore.—A steel company in the Pittsburgh district recently sent out an inquiry for 200,000 tons of ore, but it is understood that the company has not yet made any purchases against this inquiry, as sellers have been unable to secure vessel tonnage to move the ore this season. The prospective producer is behind on ore shipments from its regular source of supply, owing to delays due to the car shortage and consequently is trying to obtain a supply from outside sources. That vessel capacity was not available to move this ore is due to the fact that lake boats are behind on their regular schedules because of delays at unloading ports caused by the car shortage.

Some additional resale ore has come on the market from consumers who with curtailed production have found that they have purchased more ore than they will require. Two resale lots aggregating approximately 100,000 tons were offered a few days ago and were quickly disposed of at regular prices.

Ore shipments during August fell considerably below expectations, amounting to 9,270,763 gross tons, a decrease as compared with July when the movement was 9,638,606. Shipments up to Sept. 1 were 35,349,874 tons, a gain of 5,751,826 tons over the same period last year. Shippers who expected the season's movement to reach 60,000,000 tons have revised their estimates to 56,000,000 or 57,000,000 tons. Last year the movement of ore was 47,177,395 tons and in 1918 it was 61,156,732 tons. The falling off in shipments is attributed to the fact that the bulk of the ore during the month had to be sent to interior furnaces, most of the lake furnace docks having been filled up earlier in the season when the car shortage was more acute.

While some of the railroads have filed new tariffs increasing the unloading charges for handling ore at lower lake ports 40 per cent, effective Sept. 26, there is a possibility that the additional charge will not be placed in effect until next season. The proposed increase for moving ore from the hold to the rail of the vessel is from 10 to 14c. per ton and this would have to be paid by the shipper.

We quote delivered lower Lake ports: Old range Bessemer, $7.45; old range non-Bessemer, $6.70; Mesaba Bessemer, $7.20; Mesaba non-Bessemer, $6.55.

Pig Iron.—With reduced consumption by foundries, the supply of pig iron has become more abundant, but inquiry for prompt shipment iron has virtually disappeared with the exception of a limited demand from foundries that do not contract ahead. In spite of the holding up of shipments by automobile foundries, furnaces are able to ship about all the iron they are making. One Cleveland automobile foundry that recently stopped shipments has resumed taking iron at about one-half of its regular schedule rate. Foundries generally are not buying for next year. However, one local selling agency booked orders during the week for 5000 tons, mostly in foundry grades, of which 4500 tons was for the first half. One of these was for 2000 tons to a Michigan foundry. These sales were made at $46 and $47 base. We also note the sale of 500 tons of malleable iron for the first quarter at $46.50. A western Ohio furnace sold 200 tons of malleable iron for early shipment to New Hampshire at $47.50. This iron cost the buyer $55.90 delivered, or apparently less than the iron could be secured for from a nearer shipping point. Several inquiries are now pending for foundry iron in lots of 500 to 1000 tons for the first half and a local producer which has some high silicon iron available for early shipment has received a number of inquiries for that iron. A Cleveland selling agency reports the sale of several lots of Alabama charcoal iron in the Pittsburgh district at $60 for the first half, or $5 above the price at which Lake Superior charcoal iron is being quoted. Southern foundry is still quoted at $42 for this year and the first half.

We quote delivered Cleveland as follows, based on the new freight rates, these being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham.

Basic	$49.06
Northern No. 2 fdy., sil. 1.75 to 2.25	50.56
Southern fdy., sil. 2.25 to 2.75	49.92
Ohio silvery sil. 8 per cent	63.36
Standard low phos. Valley furnace	$56.00 to 57.00

Bolts, Nuts and Rivets.—Bolt and nut specifications are holding up well and a limited amount of new business is being placed at the advance in prices. Some inquiry is being made for rivets for the fourth quarter, but makers are not quoting for that delivery. However, some orders are being taken subject to prices prevailing at time of shipments.

Small machine bolts, rolled threads, 25 and 10 per cent off list; same sizes in cut threads, 25 per cent off list; larger and longer sizes, 25 per cent off list; carriage bolts, smaller and shorter, rolled threads, 20 and 10 per cent off; cut threads and larger and longer sizes, 20 per cent off list; lag bolts, 40 per cent off list; plow bolts, Nos. 1, 2 and 3 head, 25 per cent off list, the 20 per cent extra for other style heads being unchanged; machine bolts, both smaller and shorter, and larger and longer sizes, 10 per cent off list; hot pressed sq. and hex. blank nuts, 50c. off list; tapped nuts, list; cold pressed sq. and hex. blank nuts, list plus $1; semi-finished hex. nuts, 40 per cent off list.

Finished Iron and Steel—Demand in most finished lines is light. There is a fair demand from the railroads for steel for repair work and the Wheeling & Lake Erie Railroad is inquiring for 500 to 1000 box cars and 500 to 2000 gondola cars and the Nickel Plate railroad for six locomotives. The Lima Locomotive Corporation has recently taken 50 locomotives. There is apparently a slowing down in a number of manufacturing lines. However, manufacturers outside of the

automobile field are not holding up shipments of steel, but are not making additional purchases. Agricultural implement manufacturers are still very busy, but the manufacture of road building machinery is reported to have slowed down. Some of the automobile companies are working on the new production and steel spring schedules are expected to be sent out within two or three weeks. Deliveries on steel bars have improved and one Pittsburgh district mill can now make shipments of some sizes in three weeks. For early shipment, steel bars are still quoted at 4c. Plates are quiet with 3.25c. to 3.50c. as the usual quotations. Semi-finishel steel is quiet and sheet bars are plentiful at $70. Considerable inquiry for light rails for the first half is coming from coal mining companies, but mills are declining to quote for that delivery. The demand for wire products continues active. Deliveries from Pittsburgh mills show no improvement and because of the slow shipments warehouse stocks are decreasing.

Cleveland warehouses quote steel bars at 3.34c. to 5c.; plates, 3.64c. to 4.50c., and structural material, 3.44c. to 4.50c.; No. 9 galvanized wire, 4.70c.; No. 9 annealed wire, 4c.; No. 28 black sheets, 8.50c.; No. 28 galvanized, 9.50c.

Sheets.—Price concessions are still being made on blue annealed sheets in the heavier gages and quotations down to 5c. for No. 10 are reported. However, lighter gages are in much better demand than the heavier gages, and prices on these are firmer. A local mill is making sales at the 6.25c. basis for No. 13 to No. 16 gage, resale automobile body sheets are being offered by some of the automobile parts manufacturers in this territory at 9c., which about covers their cost, including freight and handling. Mills quote automobile body sheets at 7.85c.

Coke.—Shipments of foundry coke on contract have improved and there is an easing up in the supply for prompt shipment. Quotations for prompt shipment range from $18 to $19 for standard grades. Connellsville furnace coke is quoted at $17 to $17.50 for prompt shipment.

Old Material.—Scrap prices have softened following the flurry and sharp advance in the local market caused by the recent buying by the McKinney Steel Co. Heavy steel has declined from $1.50 to $2 a ton. The downward tendency was expected as soon as dealers had finished buying to cover their orders for the McKinney plant. As high as $29 was paid for heavy melting steel, but in the last day or two a mill has declined to take this grade at $28. Another local consumer made inquiry for steel making scrap during the week, but, owing to signs of easing in prices, withdrew from the market. Dealers are offering $18 for mixed borings and turnings. Re-rolling rails are firm, a small lot sale being made at $42. Stove plate is a drug on the market and has declined sharply.

Dealers quote delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$27.00 to $27.50
Steel rails, under 3 ft.	30.00 to 31.00
Steel rails, rerolling	39.00 to 40.00
Iron rails	32.00 to 33.00
Iron car axles	41.00 to 42.00
Steel car axles	36.00 to 37.00
Low phos. melting scrap	28.00 to 28.50
Cast borings	18.00 to 18.50
Machine shop turnings	12.75 to 13.00
Mixed borings and short turnings	18.00 to 18.50
Short turnings for blast furnaces	18.00 to 18.50
Compressed steel	23.00 to 23.50
Railroad wrought	28.00 to 29.00
Railroad malleable	33.00 to 33.25
Steel axle turnings	22.00 to 23.00
Light bundle sheet scrap	15.00 to 16.00
Drop forge flashings over 10 in.	20.00 to 21.00
Drop forge flashings under 10 in.	20.00 to 21.00
No. 1 cast	40.00 to 41.00
No. 1 busheling	19.00 to 20.00
Railroad grate bars	30.00 to 31.00
Stove plates	27.50 to 28.00
Cast-iron wheels	39.00 to 40.00
Pipes and flues	24.50 to 25.00

The Bonney-Floyd Co., Columbus, Ohio, manufacturer of steel castings, is installing a three-ton Ludlum electric steel furnace in its steel foundry. It is expected that the furnace will be ready for operation within the next few weeks.

CANADA IS OPTIMISTIC

Sharp Advance in Pig Iron Prices—Demand Continues Active

TORONTO, ONT., Sept. 7.—The demand for iron and steel of various kinds continues to hold up well throughout Canada, despite the fact that several large consumers, such as automobile manufacturers, foundries and other metal using concerns have been forced to close down or greatly curtail their operations on account of overproduction, labor troubles and the shortage of fuel. Dealers and producers of various classes of iron and steel have no worries in so far as the disposing of their output is concerned. Many have orders on their books extending well into next year, and are chiefly concerned in regard to the filling of these contracts on schedule time under existing conditions.

Entire Plant Closed

The plant of the Steel Co. of Canada, Hamilton, Ont., has been so demoralized by the shortage of fuel that it was forced to close its entire plant a short time ago, in order to accumulate enough coal and coke to keep in operation. The closing of this plant was the means of causing still further difficulty to jobbers, who were unable to get supplies from the mill. It is now stated, however, that operations at the plant of the Steel company are gradually improving and it has one furnace in operation producing pig iron for its own consumption and its finishing mills have also been started.

Pig Iron Advances

A decided advance in the price of pig iron was announced by Canadian producers last week. Pig iron, which was formerly quoted at $52.70 for No. 2 and $53.80 for No. 1 and malleable, were marked up to $57.10 for No. 2 and $58.10 per ton for No. 1 and malleable, with an additional $1.50 to $2 increase over the above prices for material for shipment to Montreal, on account of the increased freight charges. During the week producers, who were previously reluctant to accept orders for first-half, 1921, delivery, opened their books for this period and are now receiving orders for iron at the increased price. Inquiries for iron for spot and last half delivery are plentiful and dealers are still booking business on this account.

Railroad Tool Inquiries at Chicago

The Chicago & Northwestern Railroad has just issued at Chicago a list calling for quotations on the following machine tools:

One 53-in. boring and turning mill.
One 150-lb. cushioned upright power hammer.
One combination hot saw and tube expanding machine.
One floor emery grinder.
One cylinder boring bar for cylinders, 16 x 36 in.
Three 16-in. x 6-ft. engine lathes.
One 16-in. x 4-ft. engine lathe.
One elliptic spring forming machine.
One pipe-threading machine with dies for 1¼-in. to 6-in. pipe.
Eight portable crank pin turning machines.
One 24-in. drill press.
Three 18-in. x 6-ft. 6 in. engine lathes.
One 14-in. emery grinder.
One 24-in. x 10-ft. engine lathe.
Four 16-in. x 8-ft. engine lathes.
One pipe-threading machine.
One 30-in. x 8½-ft. engine lathe.
One 36-in. drill press.
One 24-in. crank shaper.
One combination punch and shear to punch 1-in. holes and shear ¾-in. plate.
One 24-in. x 14-ft. engine lathe.
Three hand power lathes.
One 24-in. x 12-ft. engine lathe.
One 18-in. x 8-ft. engine lathe.
One 36-in. grinder.
One 18-in. x 6-ft. engine lathe.
One single-head bolt cutter to cut ½ to 1 in. bolts.
One 30-in. crank planer.
One 800-lb. steam hammer.
One 30-in. x 6-ft. engine lathe.
One 50-ton forcing press, 23 in. between rods, 20 in. under arm and 6-ft. bed.
One 14-in. x 6-ft. engine lathe.

The Santa Fe Railroad has added the following tools to its recent inquiry:

One 48-in. heavy duty car-wheel boring machine.
One high-power vertical drill press, capacity 24 in.
Two portable bolt lathes, 16 in. x 6 ft.
One 54-in. heavy duty type vertical boring mill.

EXPORTERS REDUCE PERSONNEL

Little New Business Being Received—More Japanese Financial Difficulties Reported

The dullness in the export market is more marked than at any time during the past few months. While inquiries continue from European and South American buyers, they are usually for small tonnages and the purchaser objects to opening an irrevocable letter of credit. Numerous exporters were still busy during the month of August shipping on old orders, but as new business has been small the prospects are that the next few weeks will show little activity. In view of the slack condition of the market, several export concerns are reducing the numbers of their personnel. As an example of the prevailing uncertainty in export transactions where there is not an irrevocable credit, a company that had accepted an order for 7500 tons of billets from a British buyer at $75, c i.f. England, received a cancellation of the order when it was being shipped from the American port. An inquiry is in the market from a British source for about 1000 tons of ship plates, believed to be for Glasgow, Scotland. Several large lots of standard section rails before the market total in excess of 40,000 tons.

South American buyers continue to order only for immediate needs and these are, as a rule, small. One exporter in New York recently received an order for 600 tons of fine gage black sheets for first quarter delivery to a firm in Argentina. Prospects of industrial trouble and inability to place the order when mills open their books for 1921 caused him to refuse it. South American purchasers, who are receiving orders placed several months ago when the exchange rate was favorable, find that material is costing them about 10 to 12 per cent more than they expected.

In the Far East, the Dutch East Indies is the only market showing signs of activity and orders from this source are small. Some business is being transacted with India. The situation in Japan is still uncertain and few optimistic reports are received. A Japanese export house recently was informed from the home office that there are prospects of another trading company and bank becoming involved in financial difficulties as great as the Mogi Bank and Mogi & Co. Recent efforts of the government to aid silk, cotton and sugar manufacturers financially may improve the entire situation.

Export prices continue to be at a level of $2 a ton and more above domestic prices, except in the case of plates and shapes, which appear to be close to, if not at the level of domestic business. On about 2500 tons of 25-lb. rails $75 per ton, Pittsburgh basis, including accessories, was done. A small tonnage of billets sold on a basis of $65 per gross ton, Pittsburgh. Some tin plate appears to have been sold at $10 per base box. Angles of bar mill size, on a few carloads, brought for fourth quarter delivery 3.75c., Pittsburgh, and structural sizes, 3.50c., Pittsburgh.

RATING FOR BLAST FURNACES

Rule for Expressing Capacity Adopted by Ohio Pig Iron Producers

At the meeting of the Southern Ohio Pig Iron and Coke Association, held at Ironton, Aug. 24, the report of the Rating Committee was received, and its recommendation of a rule for rating blast furnaces was adopted. Charles R. Peebles, manager of the blast furnace department of the Ashland Iron & Mining Co., Ashland, Ky., is chairman of the Rating Committee, and submitted the report as follows:

"CAPACITY OF BLAST FURNACES

"Regardless of grade of pig iron produced blast furnaces of modern construction should burn about the same amount of fuel daily under the same operating conditions.

"For each grade of pig iron the tonnage which can be produced will depend upon the quality of fuel used, yield of ore mixture, and blast temperature.

"The tonnage of coke which can be burnt in a unit of time has a certain ratio to the working volume of the furnace.

"From figures prepared on a number of different sized furnaces it has been found that with good practice 60 lb. of coke can be burnt each 24 hr. per cu, ft. working volume. The working volume is taken as volume from center line of tuyeres to two feet below the bell closed.

"Therefore, the capacity of a blast furnace must be expressed in terms of pounds of coke which can be burnt per day. And in order to cover variations which exist from time to time in operation it is necessary to adopt a base coke, a base theoretical yield ore mixture, and a base hot blast temperature and then make allowances for variations as encountered."

At a previous meeting the "base coke" adopted by the association was coke containing 89 per cent fixed carbon, with sulphur under 1 per cent.

The Association also passed resolutions concerning the $10 detention charge on open top cars and cars loaded with coal, coke, and lumber. This action was reported in THE IRON AGE of Sept. 2.

The next meeting of the Association is the annual meeting for election of officers, and will be held at Hotel Marting, Ironton, Ohio, Sept. 14. The subject for discussion will be: "Flue Dust in Blast Furnaces."

IRON AND INDUSTRIAL STOCKS

Tendency of Quotations Is Upward With Confidence Returning

Prices quoted recently for steel stocks have ruled higher, presumably on buying based on the slight rise in quotations on average iron and steel products and the belief that a further advance is impending. Higher prices and freer shipments of finished products will result in larger earnings by the steel companies. The advice of President Campbell, Youngstown Sheet & Tube Co., to employees to purchase stock of that company in the open market pending a stock selling plan on an installment paying basis, was followed by a noticeable advance in the market value of the common stock.

The appointment of a receiver for the Owen-Magnetic Motor Car Corporation did not improve the market for automobile shares during the past week, and the appointment of a receiver for the Vulcan Steel Products Co. brought out selling orders for certain industrial stocks. But with the railroad issues advancing, with indications of large grain and cotton crops, with the foreign political situation less disturbing, general sentiment in stock market circles appears more cheerful. The announcement by the American Woolen Co. that it is to reopen its mills has led many to believe that the tide in general industrial conditions has turned, and this has been reflected in recent quotations for manufacturing stocks.

The range of prices on active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

Allis-Chalm. com.	31¼ - 35	Lake Sup. Corp.	11⅜ - 11⅞
Allis-Chalm. pf...	71 - 72¼	Midvale Steel....	39 - 40¼
Am. Can com....	34½ - 36¼	Nat.-Acme	33½ - 35
Am. Can pf.....	— - 89¾	Nat. E. & S. com.	58⅛ - 59
Am. C. & F. com.	133 -136½	N. Y. Air Brake..	97¼ - 97⅞
Am. C. & F. pf..	— -109½	Nova Scotia Steel	— - 44¾
Am. Loco. com...	93¾ - 96⅛	Pitts. Steel pf....	— - 88
Am. Loco. pf.....	— -100¼	Press. Steel com..	95⅞ - 96⅞
Am. Steel F. com.	36½ - 37	Press. Steel pf....	98½ -100
Am. Steel F. pf..	85⅛ - 85⅞	Ry. Stl. Spg. com.	95 - 96
Bald. Loco. com..	106⅛ -111⅜	Ry. Stl. Spg. pf...	— -100
Beth. Steel com..	72½ - 74½	Replogle Steel....	72½ - 79¾
Beth. Stl. Cl. B..	74⅜ - 77⅞	Republic com.....	83¼ - 86⅝
Beth. Stl. 8% pf.	106⅞ -107	Republic pf.....	— - 93
Case, J. I., pf....	— - 90⅜	Sloss com.....	— - 89
Chic. Pneu. Tool.	— - 81¼	Sloss pf.....	68 - 71½
Colo. Fuel.....	35½ - 36	Superior Steel....	50⅞ - 51
Cruc. Steel com..	118½ -124⅝	Un. Alloy Steel...	39¾ - 40
Cruc. Steel pf....	— - 94	U. S. Pipe com....	— - 13½
Gen. Electric.....	143⅞ -144	U. S. Steel com...	88⅛ - 90⅞
Gt. Nr. Ore Cert.	31⅝ - 32⅝	U. S. Steel pf.....	106¼ -107
Gulf States Steel.	— - 54	Vanadium Steel...	66½ - 71⅝
Int. Har. com....	123¾ -125	Va. I. C. & Coke..	112 -117
Lackawanna Steel	67⅝ - 69¾	Westingh'se Elec.	47½ - 48¾

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery.

	Copper, New York		Tin	Lead		Zinc	
Sept.	Lake	Elec-trolytic	New York	New York	St. Louis	New York	St. Louis
1.....	18.75	18.75	45.75	8.50	8.62½	8.35	8.00
2.....	18.75	18.75	45.50	8.50	8.62½	8.25	7.90
3.....	18.75	18.75	45.50	8.50	8.62½	7.90	7.90
4.....	18.75	18.75	....	8.50	8.62½	7.90	7.90
7.....	18.75	18.75	45.00	8.50	8.62½	7.90	7.90

NEW YORK, Sept. 7.

The Labor Day holiday on Monday has intensified markets, already dull. There is very little demand for copper. Tin consumers have been doing a little buying. The importations of both lead and zinc virtually control these markets in the East and prices have declined in both with demand in either case light.

New York

Copper.—Buying by domestic consumers has not increased and the dullness of the market has been intensified by the Labor Day holiday. Inquiries from some of the large consumers are reported as showing considerable increase and these are taken to indicate that a buying movement will develop inside of the next two weeks. In the meantime, while most of the leading producers adhere to the 19c. New York level for both Lake and electrolytic copper, a few of these, as well as the small producers, are taking what business there is at around 18.75c., New York, and in some cases a little lower. We therefore quote the market for both Lake and electrolytic at 18.75c., New York.

Tin.—In a quiet way the market has been a little more active than in recent weeks, and there have been some sales to consumers. Two importers report moderate buying, mostly for future shipment, at 45.50c. to 46c., depending upon the position. The total, however, has been small as compared with normal transactions. There has been a revival in the business done on the New York Metal Exchange; up to and including Friday sales there amounted to about 250 tons, the prices ranging from 45c. to 45.50c., depending upon the position. On Thursday 100 tons, ex-ship at dock, were sold under the rule in three lots at a range of 45.12½c. to 45.50c. The market on Friday closed higher, with spot quoted at 45.50c. and with 46c. asked for future shipment, with some business reported at that level. We quote the market to-day for spot Straits tin at 45c., New York. As compared with a week ago the London market has declined, the quotations to-day being as follows: Spot standard, £264 10s.; future standard at £270 10s. and spot Straits at £272 10s. The Singapore market is quoted at £280.

Lead.—The feature of this market is the pressure which is being felt from importations of lead from England, several sales having been made at 8.50c., New York, duty paid. Buying has not been very heavy, as consumers in general seem to be somewhat afraid to take the metal, in the belief that it may not measure up to standard quality. The fact, however, that the market has been offered down from this source is being used as an argument to lower the domestic market, but thus far the price of the leading interest remains unchanged at 8.75c., St. Louis, or 9c., New York. Because of the import situation the New York market is at a lower level than the St. Louis market, quotations to-day being 8.62½c. to 8.75c., St. Louis, and 8.50c., New York, for prompt and early delivery.

Zinc.—In this market also the importation of zinc from England is having considerable effect. At the same time demand from consumers is extremely light, and consumers are more or less unwilling to meet the cost of foreign zinc because of the claim that cost of production is higher than the cost of importation. Prime Western zinc from England is offered, and in some cases sold at around 7.90c. to 8c., New York, which we quote as the market. As a result of this the St. Louis market is nominally lower and practically at the same level, or 7.90c. for early delivery.

Antimony.—Wholesale lots for early delivery are unchanged in a quiet market at 7c., New York, duty paid, with jobbing lots at 7.25c. to 7.50c.

Aluminum.—Quotations by the leading interest for virgin metal, 98 to 99 per cent pure, for wholesale lots for early delivery are unchanged at 34.90c., f.o.b. producer's plant, with foreign metal, such as Swiss and Norwegian, being offered by other sellers at 32c. to 33c.

Chicago

Sept. 7.—All of the metals are quiet and tin, lead and spelter have declined. Most of the old metals have also declined. We quote Lake copper at 19c. to 19.25c., in carload lots; tin, 48c.; lead, 8.87½c.; spelter, 8c.; antimony, 8.50c. to 9c. On old metal we quote copper wires, crucible shapes, 13c.; copper clips, 13c.; copper bottoms, 11c.; red brass, 13c.; yellow brass, 8.50c.; lead pipe, 6c.; zinc, 4c.; pewter, No. 1, 22.50c.; tin foil, 27.50c.; block tin, 32.50c., all these being buying prices for less than carload lots.

St. Louis

Sept. 6.—The non-ferrous markets, with the exception of lead, have been weaker during the week, but lead has held up strongly. On car lots we quote lead, 8.75c.; spelter, 8.10c. On less than car lots the prices are: Lead, 9.25c.; spelter, 8.75c.; tin, 53c.; copper, 19c.; antimony, 9c. In the Joplin district lead ore was held firmly at $110 per ton, but zinc blende and calamine showed practically no change from the prices which have previously prevailed. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 8c.; heavy yellow brass, 10c.; heavy red brass, 14c.; heavy copper and copper wire, 14c.; light copper, 12c.; pewter, 25c.; tinfoil, 38c.; tea lead, 3c.; zinc, 4.50c.; lead, 6.50c.; aluminum, 20c.

Contracts for Guns Awarded

WASHINGTON, Sept. 8.—The Midvale Steel Co. has been awarded a contract by the Navy Department for six 16-in. guns at $256,000 per gun. The Bethlehem Steel Co. has been awarded a contract for six 16-in. guns at $257,500 per gun. Contracts have been awarded also to the Bethlehem Steel Co. for four sets of gun forgings at 35c. per lb. for gun steel and 45c. per lb. for alloy steel and to the Erie Forge Co. for 18 sets of gun forgings at 23c. per lb. These contracts complete the manufacturing orders for 150 16-in. guns which will be required by the present Navy building program for battleships and battle cruisers including 30 guns which will be built as spares. Of this number 60 guns will be built by private companies and 90 guns by the naval gun factory. In addition to these contracts the Midvale Steel Co. and the Bethlehem Steel Co. each has a contract for 24 16-in. guns.

Employees of the Youngstown Sheet & Tube Co. and the Brier Hill Steel Co., both of Youngstown, Ohio, enjoyed their annual Field Day programs on Labor Day. Officials of both companies participated. Roy Welsh, assistant to the president in charge of Industrial Relations, directed the Sheet & Tube company outing at Campbell Park, while J. F. King, assistant to Warren F. Perry, manager of Industrial Relations, was chairman of the Brier Hill company Field Day at the Brier Hill athletic park. Cash prizes donated by the companies were awarded winners in athletic events.

A 40 x 50-ft. addition to its research laboratory connected with its steel mills at Lockport, N. Y., has been completed by the Simonds Mfg. Co., maker of saws. A 300 to 500 lb. capacity special type electrical melting furnace, several electric heating furnaces and other tools and equipment have been installed.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

New York, 38c.; Philadelphia, 35c.; Boston, 41½c.; Buffalo, 29½c.; Cleveland, 24c.; Cincinnati, 33c.; Indianapolis, 34½c.; Chicago, 38c.; St. Louis, 47½c.; Kansas City, 81½c.; St. Paul, 69½c.; all in carloads, minimum 36,000 lb.; to Denver, the rate is $1.35, minimum carload 40,000 lb.; Omaha, 81½c., minimum carload 36,000 lb.; New Orleans, 51½c., minimum carload 36,000 lb.; Birmingham, 76½c., minimum carload 36,000 lb.; to the Pacific Coast the rate is $1.66½ per 100 lb. on articles of iron and steel, minimum carloads 80,000 lb., while the structural steel rate is $1.66½, minimum carload 50,000 lb., or $1.75½, minimum carload 40,000 lb.; the rate on ship plates, Pittsburgh to Pacific Coast, is $1.33½ per 100 lb., minimum carload 80,000 lb.; on wrought iron and steel pipe, the rate from Pittsburgh to Kansas City is 78½c.; to St. Paul, 69½c.; to Denver, $1.35; to Omaha, 78½c.; all in carload lots, minimum 46,000 lb.; to Jacksonville, Fla., all rail carloads, 55½c., minimum 36,000 lb.; rail and water, carloads, 46c., minimum 36,000 lb. On iron and steel items not noted above, the rates vary somewhat and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in., angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 2.45c. to 3.25c.

Wire Products

Wire nails, $3.25 to $4.50 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.50 to $2 and shorter than 1 in., $2 to $2.50. Bright basic wire, $3 to $4 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.25 to $4.25; galvanized wire, $3.70 to $4.70; galvanized barbed wire and fence staples, $4.10 to $5.10; painted barbed wire, $3.40 to $4.45; polished fence staples, $3.40 to $4.50; cement-coated nails, per count keg, $2.85 to $4.10; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 55 to 60 per cent off list for carload lots, 54 to 59 per cent for 1000-rod lots, and 53 to 58 per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets	$4.50 to $5.00 base
Large boiler rivets	4.60 to 5.00 base
Small rivets	40 per cent off list
Small machine bolts, rolled threads	25 and 10 per cent off list
Same sizes in cut threads	25 per cent off list
Longer and larger sizes of machine bolts	25 per cent off list
Carriage bolts, ⅜-in. x 6-in.:	
Smaller and shorter, rolled threads	20 per cent off list
Cut threads	20 per cent off list
Longer and larger sizes	20 per cent off list
Lag bolts	40 per cent off list
Plow bolts No. 1, 2 and 3 head	35 per cent off list
Other style heads	20 per cent extra
Machine bolts, c.p.c. and t. nuts ⅜-in. x 4-in.:	
Smaller and shorter	10 per cent off list
Longer and larger sizes	10 per cent off list
Hot pressed and cold pressed sq. or hex. blank nuts	$1.00 off list
Tapped nuts	list
C. p. c. & t. sq. or hex. nuts, blank	40 per cent off list
C. p. c. & t. sq. or hex. nuts, tapped	40 per cent off list
Semi-finished hex. nuts, U. S. S. and S. A. E.:	
⅝-in. and larger	40 per cent off list
9/16-in. and smaller	40 per cent off list
Stove bolts in packages	60 and 10 per cent off list
Stove bolts, in bulk	60, 10 and 2½ per cent off list
Tire bolts	50 per cent off list
Track bolts	7c. base
Iron cap screws	40 per cent off list
Set screws	40 and 10 per cent off list

One cent per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs 25c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $52 to $80; chain rods, $75 to $80; screw stock rods, $80 to $85; rivet and bolt rods and other rods of that character, $75 to $80; high carbon rods, $85 to $100, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $4 to $4.25 per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and ¾-in., $4.40 to $4.75; 5/16-in., $5 to $5.50; track bolts, $5. Boat and barge spikes, $4.40 to $4.75 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Tie plates, $3 to $4 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 sheets, $13.80 per package; 8-lb. coating, I. C., $14.10; 12-lb. coating, I. C., $15.80; 15-lb. coating, I. C., $16.80; 20-lb. coating, I. C., $18.85; 25-lb. coating, I. C., $19.30; 30-lb. coating, I. C., $20.30; 35-lb. coating, I. C., $21.30; 40-lb. coating, I. C., $22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.35c. to 4c. from mill. Common bar iron, 4.75c.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches.	Black	Galv.	Inches	Black	Galv.
⅛, ¼ and ⅜	47 to 50½	20½ to 24	⅜	15½ to 25½	+11½ to 11½
½	51 to 54½	36½ to 40	½	19½ to 29½	1½ to 11½
¾ to 3	54 to 57½	41½ to 44	¾ to 1½	24½ to 34½	8 to 18½

Lap Weld

2	47 to 50½	34½ to 38	2	20½ to 28½	6½ to 14½
2½ to 6	50 to 53½	37½ to 41	2½ to 6	22½ to 30½	9½ to 17½
7 to 12	47 to 50½	33½ to 37	7 to 12	19½ to 27½	6½ to 14½
13 and 14	37½ to 41				
15	35 to 38½				

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	43 to 46½	25½ to 29	¼	+17	+50
½	48 to 51½	35½ to 39	⅜	13½ to 23½	6½ to+3½
¾ to 1½	52 to 55½	39½ to 43	½	18½ to 28½	8½ to 15½
2 to 3	53 to 56½	40½ to 44	¾ to 1½	24½ to 34½	9½ to 19½

Lap Weld, extra strong, plain ends

2	45 to 48½	33½ to 37	2	21½ to 29½	8½ to 16½
2½ to 4	48 to 51½	36½ to 40	2½ to 4	23½ to 31½	11½ to 19½
4½ to 6	47 to 50½	35½ to 39	4½ to 6	22½ to 30½	10½ to 18½
7 to 8	43 to 46½	29½ to 33	7 to 8	14½ to 22½	2½ to 10½
9 to 12	38 to 41½	24½ to 28	9 to 12	9½ to 17½	5½ to+2½

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots and on butt and lap weld galvanized iron pipes have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
3½ to 4½ in.	15 to 40½	1¾ and 1⅞ in.	+20
2½ to 3¼ in.	10 to 30½	2 and 2½ in.	+10
2¼ in.	4 to 24	2½ and 2¾ in.	+1
1¾ to 2 in.	+ ½ to — 19½	3 and 3½ in.	—1½
		3½, 4 and 4½ in.	—8

Standard Commercial Seamless—Cold Drawn or Hot Rolled

	Per Net Ton		Per Net Ton
1 in.	$327	1¾ in.	$207
1¼ in.	267	2 to 2½ in.	177
1⅜ in.	257	2¾ and 3¾ in.	167
1½ in.	207	4 in.	187
		4½ to 5 in.	207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department which will be subject to special negotiations.

Sheets

Prices of the Steel Corporation for mill shipments on sheets of United States standard gage in carloads and larger lots for indefinite delivery are given in the left-hand column. For reasonably prompt delivery, mills are getting up to the prices quoted in the right-hand column:

Blue Annealed

	Cents per lb.
No. 8 and heavier	3.50 to 7.45
Nos. 9 and 10 (base)	3.55 to 7.50
Nos. 11 and 12	3.60 to 7.55
Nos. 13 and 14	3.65 to 7.60
Nos. 15 and 16	3.75 to 7.70

Box Annealed, One Pass Cold Rolled

Nos. 17 to 21	4.15 to 8.30
Nos. 22 to 24	4.20 to 8.35
Nos. 25 and 26	4.25 to 8.40
No. 27	4.30 to 8.45
No. 28 (base)	4.35 to 8.50
No. 29	4.45 to 8.60
No. 30	4.55 to 8.70

Galvanized Black Sheet Gage

Nos. 10 and 11	4.70 to 8.50
Nos. 12 to 14	4.80 to 8.60
Nos. 15 and 16	4.95 to 8.75
Nos. 17 to 21	5.10 to 8.90
Nos. 22 to 24	5.25 to 9.05
Nos. 25 and 26	5.40 to 9.20
No. 27	5.55 to 9.35
No. 28 (base)	5.70 to 9.50
No. 29	5.95 to 9.75
No. 30	6.20 to 10.00

Tin-Mill Black Plate

Nos. 15 and 16	4.15 to 7.80
Nos. 17 to 21	4.20 to 7.85
Nos. 22 to 24	4.25 to 7.90
Nos. 25 to 27	4.30 to 7.95
No. 28 (base)	4.35 to 8.00
No. 29	4.40 to 8.05
No. 30	4.40 to 8.05
Nos. 30½ and 31	4.45 to 8.10

PERSONAL

M. A. Hanna & Co., Cleveland, will open a pig iron sales office in Cincinnati to handle the pig iron sales of the Marting Iron & Steel Co., Ironton, Ohio, of which the Hanna firm has been appointed the sales agent. B. S. Stephenson, who has been resident agent for M. A. Hanna & Co. in Pittsburgh for several years, has been transferred to Cincinnati, where he will have charge of the pig iron sales as resident agent with offices in the Union Trust Bldg. Mr. Stephenson has been succeeded in Pittsburgh by George D. Buckwell, who has been his assistant in that city. Before going to Pittsburgh for his firm, Mr. Stephenson was connected with the Detroit office. He is a graduate of Ohio State University. Mr. Buckwell has been identified with M. A. Hanna & Co. at their Pittsburgh office since April 1, 1919, and has had charge of the firm's fuel sales in that city. He is a native of Cleveland, graduated from Cornell University in 1916, and joined the Hanna firm after his discharge from the army, where he made an admirable record.

B. S. STEPHENSON

J. S. Fraser, who recently resigned from the Monessen, Pa., works of the Pittsburgh Steel Co., has accepted a position as resident manager for the new Trumbull Cliffs Furnace Co., with headquarters at Warren, Ohio.

George H. Mueller, formerly with the J. I. Case Plow Works Co., Racine, Wis., has become associated with the Termaat-Monahan Mfg. Co., Oshkosh, Wis., as vice-president and general manager. During the war Mr. Mueller served as chief engineer of the Curtiss Aeroplane Motors Corporation, which built the original Liberty motor under his supervision. Previously he was with the Willys-Overland Co. and for several years chief engineer and New York sales manager of the Jeffery Mfg. Co., Columbus, Ohio. He is a graduate of Purdue and Cornell Universities. The Termaat-Monahan company conducts a foundry and machine shop manufacturing gasoline engines, portable sawmill outfits, etc.

J. P. Pero, Jr., vice-president and sales manager of the Warren Steel Casting Co., St. Louis, has resigned his position and has retired from the directorship. He has been succeeded by M. M. Broad, secretary of the company.

C. E. Neubert, assistant district manager of the Warner & Swasey Co.'s Chicago office, has been appointed district manager of the company's Buffalo office located in the Iroquois Building, to succeed W. E. Marshall, former manager, who recently died.

Ira Smith has been made division manager, Plant B, New Departure Mfg. Co., Bristol, Conn., to succeed Edward D. Rockwell, who recently acquired a hardware business. Mr. Smith has been superintendent at Plant B for several years.

Giulio Pontecorvo, president Pontecorvo, Munson, Co., Inc., New York, heads the firm of Pontecorvo, Hauss & Co., 7 Corso Italia, Milan, Italy, now being organized to import pig iron and steel from the United States. C. L. Hauss, who has had an extended experience in Italy in iron and steel exports, and who is a native of the United States, will represent the firm in Milan. Mr. Pontecorvo was scheduled to leave Milan about Sept. 1 for New York.

E. G. Miles has resigned as chief engineer for the Maxwell-Chalmers Co.

Carl H. Peterson, superintendent of the Oldsmobile axle plant at Lansing, Mich., has resigned to become general superintendent of the Jackson Motors Corporation, Jackson, Mich.

Ernest Cody, Lansing, Mich., who has been connected for several years with the Philadelphia branch of the Lansing Co., has been selected to take charge of the McWhinnie wheelbarrow plant, at Schenectady, N. Y., which was recently acquired by the Lansing Co.

A. B. Way, formerly secretary and general manager of the Bridgeport Chain Co., has become affiliated with the Chain Products Co., Cleveland, Ohio, as district sales manager for New England, with headquarters at the company's New York office, 150 Chambers Street. For some years prior to his identification with the chain industry he had been connected with several New England manufacturing concerns. During the war Mr. Way served as chairman of the board of weldless wire chain manufacturers of the War Industries Board.

Robert M. Gates has been appointed managing engineer in charge of the Philadelphia district of the Lakewood Engineering Co., with offices at 1034 Widener Building, Philadelphia. He is a graduate of Purdue University and is at present chairman of the material handling section of the American Society of Mechanical Engineers. He has devoted the past twelve years to the design, application and engineering surveys of mechanical means of conserving labor in the construction, industrial and transportation fields.

R. B. Swearer has been appointed New York district representative of the Morgan Engineering Co., Alliance, Ohio. The New York offices of the company are at 120 Broadway. Mr. Swearer, who was in the United States Navy during the war, after his discharge became connected with the sales staff of the Liberty Steel Products Co., 233 Broadway, New York.

Walter S. Schultz, commissioner of the National Exposition of United States Manufacturers, to be held in Buenos Aires, Argentina, in March and April of next year, was in Cincinnati last week consulting with machine tool manufacturers who propose making exhibits at the exposition. Ten Cincinnati firms have already reserved space, and it is expected that a number of others will do so in the near future.

Benjamin T. Leland, professor of industrial education, West Virginia University, has been appointed State Supervisor of Industrial Education by the Rhode Island Board of Education.

John Albright, erecting engineer, formerly with the Toledo Bridge & Crane Co., Toledo, and later connected with the Northern Engineering Works, Detroit, is now erecting engineer for the Champion Engineering Co., Kenton, Ohio. He will make his headquarters in Kenton, but will spend much of his time in New York.

W. G. Merten, metallurgist of the Westinghouse Electric & Mfg. Co., East Pittsburgh, will present a paper, the subject of which is "A New Method of Case Hardening," at the first fall joint meeting of the American Steel Treaters' Society and the Steel Treating Research Society, to be held at Hotel Chatham, Pittsburgh, Thursday evening, Sept. 9.

Martin Oppenshaw, of Victor Karminski & Co., 291 Broadway, New York, exporters, sailed Sept. 2 for England, where he will join Victor Karminski, who recently left to visit the foreign offices of the company in London and Swansea. Together they will arrange to establish offices in Gothenburg, Stockholm, Helsingfors, Amsterdam and Brussels.

William Breeden, formerly district manager of sales of the Philadelphia office of the Lackawanna Steel Co., has been named manager of sales at Buffalo in charge of all sales forces and attached to the office of H. H. Barbour, vice-president in charge of sales of the Lackawanna company. Mr. Breeden has been with the Lackawanna company for nine years, and was previously with the Carnegie Steel Co.

Dr. E. F. Northrup has resigned his professorship at Princeton University in order to devote his entire time to his work with the Ajax Electrothermic Corpo-

ration, Trenton, N. J., manufacturer of the Ajax-Northrup high-frequency induction furnaces. He was recently elected vice-president of the company and is now engaged in perfecting a brass-melting furnace of the Ajax-Northrup type.

R. C. Kirk, who recently resigned as president of LaBelle Iron Works, also has resigned as president of that company and from the Wheeling Steel Corporation, of which he was director and a member of the executive board. Mr. Kirk expects to take a much-needed rest after 26 years of continuous service, and has made no plans for the immediate future.

Suit to Test Powers of Interstate Commerce Commission

A suit to test the powers of the Interstate Commerce Commission to enforce Service Order No. 9 of the Esch-Cummins railroad bill, was filed in the United States District Court at Covington, Ky., Aug. 31, by the Arcadia Coal Co. and 13 other coal companies operating in Bell, Knox and Harlan counties, Kentucky. The suit is directed against the United States Government, the Interstate Commerce Commission and the Louisville & Nashville Railroad, and is the first of its kind filed against the Interstate Commerce Commission to prevent the enforcement of the Cummins railroad bill. The complainant companies allege that under the section of the law complained of preferential assignment of coal cars is made to designated coal companies on the Cumberland Valley division of the Louisville & Nashville Railroad, which makes it impossible for the complainants to market their coal, retain their employees or operate their mines. The complainants further allege that if the railroad company is not restrained from obedience to the section complained of they will suffer great loss and consumers will eventually be compelled to pay much higher prices for coal. The suit will probably be heard in the United States Court in the near future.

Norwegian Arbitration Decision

WASHINGTON, Sept. 7.—The first decision handed down by the new Norwegian Court of Compulsory Arbitration concerns the iron and steel workers of the kingdom, according to a special report made by Minister Schmedemann at Christiania. The decision fixes the minimum wage for skilled iron and metal workers at 1.50 crowns per hour and for ordinary workers at 1.30 crowns per hour. In addition to this minimum wage, every worker above the age of 19, except apprentices, will receive a personal increase of 0.40 crowns per hour while the wage for women over 18 is made one crown per hour and for women under 18, 0.85 crowns per hour. Women will receive in addition a personal increase of 0.30 crowns per hour. Apprentices are to receive 0.65 crowns per hour, as in the past, but in the tenth half-year of their apprenticeship, will receive 1.30 crowns instead of the 1.10 crowns of the old tariff.

Navy Ordnance Plant Sold

WASHINGTON, Sept. 7.—The Navy Department has accepted the bid of J. F. Ohmer of $144,000 for the Navy Ordnance plant at Dayton, Ohio. Only one other bid was received, offering $120,000 for the plant. Mr. Ohmer had previously made a private bid of $164,000, but this was reduced because a portion of the machinery in the plant had been removed to other naval bases.

The Pennsylvania Pump & Compressor Co., Easton, Pa., announces the opening of additional sales offices in the following cities: Buffalo, 788 Potomac Avenue, J. B. Laird, manager; Cleveland, 232 St. Clair Avenue, N. E., L. J. Wakefield; St. Louis, 1956 North Broadway, Corby Supply Co.; Minneapolis, 423 Fifth Street South, L. E. Pollard Co.; Omaha, 804 First National Bank Building, L. E. Pollard Co.

OBITUARY

WILLIAM EDWIN SESSIONS, whose death was reported in THE IRON AGE of Sept. 2, was president of the Sessions Foundry Co., Bristol, Conn., which was founded in 1879 by Mr. Sessions and his father, the late John Humphrey Sessions. Mr. Sessions was born in Bristol, Conn., Feb. 18, 1857, and was a direct descendant on his father's side of Albert Sessions, who settled in Plymouth Colony in 1669. He was also a descendant of James Chilton and Francis Cook, who came over on the Mayflower. Mr. Sessions attended the Bristol schools and later the Hartford High School, from which he was graduated in 1876. The year following his graduation from high school he entered the employ of his father. In 1879, with his father, he took over the Bristol Foundry Co. and made it the Sessions Foundry Co. After 16 years of successful operation the three-acre plant on Laurel Street became too small, and to take care of the greatly increased business Mr. Sessions purchased a large tract of land on Farmington Avenue, where the present plant was installed and property developed for home sites for his employees. Mr. Sessions was noted for the interest he took in his employees and their families. One of the devices utilized to get in closer touch with them was a huge fete held each year on the spacious lawns surrounding the Farmington Avenue plant. In 1902 Mr. Sessions purchased a controlling interest in the E. N. Welch Co., maker of clocks, which at the time was on the brink of failure, and as president not only put the concern back on a firm basis again but also succeeded in trebling the business. Ten years ago Mr. Sessions also organized the Bristol Trust Co., of which he was president.

W. E. SESSIONS

JAMES THOMPSON, who died recently at his home in Oakmont, Pa., was general manager of the Stroh Steel-Hardening Process Co., Pittsburgh, since its organization about eight years ago. A number of years previously he was affiliated with the Bair & Gazzam Machinery Co. He was born at Scio, Ohio, 76 years ago, coming to Pittsburgh with his parents when quite young.

Lake Iron Ore Shipments in August

Shipments of iron ore from the Lake Superior region in August were very heavy as compared with those for August, 1919. This year they were 9,270,763 gross tons, which compare with 4,416,200 tons in August, 1919. The increase over last year was therefore, 4,854,567 or 108.91 per cent tons. The totals by ports, with season shipments, and a comparison with 1919, are given below:

	August, 1920	August, 1919	To Sept. 1, 1920	To Sept. 1, 1919
Escanaba	1,277,561	336,334	4,394,838	2,757,897
Marquette	602,567	277,843	2,141,291	1,169,569
Ashland	1,327,294	375,245	4,933,402	3,320,090
Superior	2,266,497	939,979	8,961,424	6,426,447
Duluth	2,351,918	1,643,788	9,352,140	11,466,924
Two Harbors	1,444,926	847,944	5,566,779	4,464,054
Total	9,270,763	4,423,133	35,349,874	29,604,981

The increase in season shipments to Sept. 1, 1920, has been 5,751,826 tons, or 19.43 per cent, as compared with a decrease for the same period a year ago of 9,729,283 tons.

Of the season's total to Sept. 1, the Great Northern dock contributed 21.63 per cent, as against 17.91 per cent a year ago. Duluth is credited this year with 26.46 per cent of this season's total as compared with 38.77 per cent a year ago.

SEVERE CRITICISM

Conclusions of Government Bulletin Declared Unwarranted and Unscientific

"Unwarranted Conclusions Regarding the Eight-Hour and Ten-Hour Workday" is the subject of a special report by the National Industrial Conference Board in adverse criticism of U. S. Public Health Bulletin No. 106, issued some months ago. This bulletin announces conclusions wholly in favor of the eight-hour day, both on the score of efficiency and in several particular aspects. The Conference Board's objections to the conclusions of the report are based on two main grounds: "(1) The two plants from which the data were obtained are not fairly comparable, and (2) the basis of experience is too small to justify comprehensive conclusions applicable to industry in general." The Conference Board some months ago itself issued a report of working days of different lengths, with the statement that the facts reported were not conclusive as to industry in general.

Plants Not Fairly Comparable

As evidence that the reasoning of the bulletin is unsound, the Conference Board's report makes these points:

The Government report undertakes to compare a thoroughly established and highly efficient manufactory of automobiles running on an eight-hour schedule with a rapidly expanding munitions plant characteristic of the mushroom growth of war industries and operating with a hastily recruited labor force. The differences were such as experience has shown to be the causes of variation in production. Thus,

(1) The eight-hour plant was slightly reducing its labor force during the year under investigation, while the 10-hour plant was growing from a payroll of 3600 in 1914 to more than twice that number in 1915 and at the end of 1917 had reached nearly 13,000.

(2) The number of women at the eight-hour plant was only about one per cent of the whole, while in the 10-hour plant it was 25 per cent of the whole.

(3) The minimum wage paid in the eight-hour plant was $5 for men or women over 18, while in the 10-hour plant the piece-rate wage in 1918 was $3.20 per day for men and $2.80 for women.

(4) The eight-hour plant was situated in an established industrial community and most of the workers are said to own their homes, while the 10-hour plant was located in a town not prepared to receive so large an influx of population, with resultant insufficiency of housing, lunch rooms, and other means of comfort.

(5) The operations studied at the eight-hour plant were the characteristic processes of an automobile factory, to which the personnel were thoroughly accustomed, while the operations studied at the 10-hour plant were the novel ones of making brass fuses for 3-in. shells.

Data Too Meagre for Conclusions

Even had the two plants been comparable with respect to the conclusions drawn, says the Conference Board's report, the basis of experience was too meagre to warrant such conclusions as the Government's document presents. "So complicated is the problem, with so many collateral factors entering into it, that only by collecting experience from a large number of establishments are conclusions of a broad nature warranted."

Among the collateral factors entering into the problem, as the board sees it, are such as disturbance of efficiency by changes in styles, patterns, etc.; changes in materials used; changes in methods of wage payments; quality of workers in a given department, or in a prior process; labor unrest; changes in management or processes; changes in machinery and equipment.

Another feature of the Government's document which causes profound concern, says the Conference Board, is, that while many of the insufficiencies of data and generally limited bases of comparison are recognized in the text of the study, the qualifications made in such connections do not appear in the conclusions. These, on the contrary, are stated broadly and without qualifications.

"There can therefore be no question," says the board, "that the difficult problem of industrial readjustment now pressing upon the country will be further complicated by the unqualified and dogmatic phrasing of the conclusions presented in the bulletin. . . . The official sanction behind the publication of these conclusions gives them special prestige in the minds of many people. It is always against public interest for unwarranted and unscientific statements relating to any important problem to be given publicity, whatever the source may be. In these days of industrial unrest it is especially unfortunate if that source is an agency of the Government. Such is the condemnation that can justly be leveled against Public Health Bulletin No. 106."

Wheeling Steel Stock for Employees

The newly organized Wheeling Steel Corporation, which recently took over the Wheeling Steel & Iron Co., and the Whitaker-Glessner Co. of Wheeling, W. Va., and the LaBelle Iron Works of Steubenville, Ohio, has announced that it will sell stock to its employees, much on the same plan as that used for some years by the United States Steel Corporation, in the sale of stock to its thousands of employees, and which has worked out so satisfactorily. Opportunity is given to subscribe for common stock at $80 per share, not exceeding an aggregate total of 8000 shares, an employee having the privilege of subscribing for one share for each $500, or part thereof, of salary, to a maximum of 15 shares. Interest is charged on deferred payments at six per cent and dividends are credited as part payment on the stock.

As an inducement for the employee to keep the stock, the corporation makes the following offer: If the employee will keep the stock and in September of each year, for five years, commencing with September, 1921, will exhibit the certificate to the treasurer of his company together with a statement from a proper official that he has been continuously in the employ of the corporation or of one or another of its subsidiary companies during the preceding year, and has shown a proper interest in its welfare and progress he will for each of such five years receive a cash payment at the rate of $4 a share for each share of common stock. Subscribers who may not have fully paid their subscriptions by September in any year will, if their subscriptions are still in force, and they have otherwise fulfilled all the conditions of continuous and faithful service as provided, be credited in their subscription accounts with the foregoing special allowance of $4 per share on their subscriptions for common stock.

Steel Companies May Build Railroad

Steel producing interests in the Youngstown district have under consideration a plan to build a privately owned railroad from limestone quarries at Hillsville, Pa., to the blast furnaces at Youngstown, a distance of about five and one-half miles, to haul stone to the furnaces and slag and other refuse away from the plants. The steel makers regard the new freight rate of 84c. per ton on flux-stone and 69c. per ton for carrying slag which the railroads employ for their own use, as excessive. Such a road would save the steel interests a large sum yearly and would furthermore enable the railroads to divert cars used for such purposes to other requirements. Major producers in the Youngstown territory have placed orders for large numbers of open-top cars which would be available for such transportation purposes, besides hauling coal and ore.

The Penn Iron & Coal Co., Cleveland, an M. A. Hanna & Co. interest, will enlarge its coke oven plant in connection with its Dover, Ohio, blast furnaces by the erection of four additional Roberts ovens. An extensive program also will be carried out in improvements to the Dover blast furnace plant, including addition of equipment.

Shall Labor Get Complete Control?

Charles Piez Says Steel Strike Was Deliberate Attempt to Wrest Industry From Its Owners —Pen Pictures of Foster and Fitzpatrick

CHARLES PIEZ, president Link-Belt Co., former Director-General of the Emergency Fleet Corporation, and former chairman of the Illinois Workmen's Compensation Commission, in a signed article in the *Independent* of Sept. 4, says in part:

"Mr. Coleman and the other members of the Commission of Inquiry of the Interchurch World Movement made the primary mistake in concluding that the strike 'was waged wholly in the cause of hours, wages and control of jobs and over the manner in which all these matters were determined,' and I am afraid that this primary error resulted in a train of erroneous conclusions. To those of us who have spent the last two years on the industrial firing line, the steel strike was but one of a series of broad, industrial disturbances that were deliberately designed to wrest the control of industry from its owners, and place it in the hands of the radical element of organized labor.

"These disturbances began with the strike of the shipyard workers in January, 1919. In this case the men, under exceedingly unwise and intemperate leadership went on a strike in defiance of an agreement solemnly entered into with the Emergency Fleet Corporation, an arm of the Federal Government. The agreement had but nine weeks to run to expiration, yet so intolerant and arbitrary was the leadership, that the plants in the entire Puget Sound district were shut down without giving the men concerned an opportunity to express themselves on so vital a matter, through a fair referendum.

The Real Purpose.

"I was at that time Director General of the Fleet Corporation, and know that there was no question of hours or conditions involved. The Government had spent millions in safeguarding the workers, in adding to their comfort, in providing them with a voice in matters affecting their interests, and had organized with the sanction and co-operation of the men, a tribunal, on which the Government, the men, and the public had representation, to decide all questions of hours, wages and conditions. Every one of the conditions which Mr. Coleman and his committee contend for had been properly met, but the men struck against the Federal Government in the face of the agreement. And what is more; organized labor in the Seattle district surrendered to radical leadership and organized the strike to force the hands of the Government.

"The propaganda issued by the reds during and previous to that disturbance, the utterances of the leaders of the general strike, a majority of whom were aliens, rather leads to the conclusion that the strike had its origin, not in a question of hours, wages and conditions, but in a purpose to secure control of industry in the Puget Sound district. Only the courage of Seattle's executive stood in the way.

"The spirit of unrest which followed the armistice lent a fertile field for the demagogue and the paid agitator. Any statement, no matter how wild and unfounded that labor was being exploited, that labor alone produced wealth, and that industry's profits were swollen far beyond the fair and reasonable limits, found a ready audience and general credence.

"Very few wage contracts survived the onslaughts which the general dissemination of such misinformation brought about, and employers generally feel today that a labor contract is observed only so long as it is to labor's advantage to do so.

Character of the Leaders.

"In inquiring into the steel strike, would it not be wise to measure its purpose by the character of its leaders? William Z. Foster, one of the two leaders, is an avowed syndicalist, who has publicly announced that 'the wage system is the most brazen and gigantic robbery ever perpetrated since the world began.' John Fitzpatrick, the other leader, is a man who was violently opposed to the passage of any workmen's compensation legislation in Illinois. He has in the 10 years I have known him, never to my knowledge advanced, or even advocated any constructive piece of legislation, and he has held his position with the Chicago Federation, because he is honest and because he is a skilled labor politician. John Fitzpatrick hasn't the slightest idea of the problems of industry, he can't conceive of overhead expense as anything more than graft, and he lacks all knowledge of the problems of production, distribution and the sale of the products of industry. His horizon begins and ends with the wrongs that labor has suffered, and he usually refers to wrongs that wise legislation and a changed relationship have remedied.

"That the commission succumbed to the spell of Mr. Fitzpatrick's personality is a tribute to Mr. Fitzpatrick's dramatic powers, but hardly to his sincerity or to the justice of his cause.

Great Labor Prize

"To Foster and Fitzpatrick the steel industry presented an opportunity for organization, not for a righting of industrial wrongs. It was the great labor prize of the industrial field, and to succeed in organizing the Steel Corporation, would bring to the leaders the broadest recognition and the highest reward the labor world had to offer.

"The real or imaginary wrongs of the workers played not the slightest part in the decision to organize the steel industry.

"It was the citadel of the open shop that was the subject of attack, it was the last barrier against complete and final unionization of American industry, against which Foster and Fitzpatrick combined their resources.

"And it is to the everlasting credit of Judge Gary that he successfully resisted this attack, for it is to the interest of the public that the principle of the open shop be sustained.

"We have had many examples in the past two years of the effects of unlimited power in the hands of arbitrary, unwise, and selfish leadership. Organized labor has grown in membership, in political influence, in political power, and the public is today concerned, not with bringing industry within the pale of the law, but in devising some means of enforcing upon labor collective responsibility for collective action.

"Lenine and Trotzky are said to head an organization of 600,000 members, yet they control the destiny of 120,000,000 people.

"The leaders who could control the railroads, the coal mines and the steel industry through the complete organization of the employees of these three vital occupations, would have a strangle hold on the public.

What Control Would Mean

"The effect of a complete labor control of industry would be infinitely more baneful to the public's interest than a complete monopoly of industry by capital, because it would be harder to regulate, and more difficult to end.

"We have escaped monopoly by capital, let us see to it that our emotions and sympathies will not lead us into the toils of a labor monopoly.

"Our labor friends are skilled in the art of arousing sympathy, and are ever ready to make appeal to that great quality in the American people. But let us all meet these appeals with the knowledge that, for the nonce, labor is the top dog in the industrial struggle, and that hereafter labor's plea for general control of

industry must be weighed in the light of its influence on the public welfare.

"Labor today controls our railroads and our coal mines, and the public is in daily dread lest a new demand will result in another stoppage of the service of these two vital industries.

"The spirit of competition, that life-giving fillip of American enterprise, no longer exists in these industries, and the deterioration in service shows it.

"Are we prepared to surrender still another of our large industries to the control of an unseasoned, unwise, an often wholly selfish and an always irresponsible leadership? And would Mr. Foster and Mr. Fitspatrick give us better and cheaper steel and a more contented mass of employees than Judge Gary and Mr. Schwab?

"Let us admit that there is a sad lack of understanding between many employers and their employees, but let us also acknowledge the tremendous strides which industry generally has made in the last decade in the improvement in the sanitation and safety of its workshops.

Industry Advancing Steadily

"As political democracy has evolved to its present by no means complete state through the slow process of centuries of strife and adjustment, so industry is advancing steadily toward better understanding, a more effective co-operation, toward, if you please, a more democratic form of administration. There is much to overcome before a perfect scheme of industrial control is reached, and it cannot be reached without occasional strife. But that is no reason why we should despair of the ultimate result.

"The leaders of labor and the leaders of industry represent a cross section of American manhood. Neither are lily white, neither jet black. They are engaged in an economic struggle in which the public's interest frequently suffers, and it therefore behooves the public to revise the rules under which the contest takes place.

"The most effective revision would be to enforce responsibility for losses deliberately, arbitrarily, or inconsiderately inflicted. That would, at least, narrow the bounds of the conflict and reduce the loss. And in the meantime, the public would itself learn to appreciate the relative value of the three factors in industry, capital, labor and management, and would find a way of determining the compensation due to each. For that, after all, is the problem."

Highest Puddling Rate in History of Bar Iron Industry

The puddling rate of $18.02 for the September-October period is the highest in the history of the bar iron industry, although the card rate of 3.40c. on which it is based, was superseded in the September-October and November-December periods of 1918 by a 3.45c. rate. In the interim, though, puddlers and muck mill hands who deal with the Western Bar Iron Association through the Amalgamated Association of Iron, Steel and Tin Workers have received a number of advances on the base rate, which accounts for the higher puddling rate at the 3.40c. card.

The new card compares with an average invoiced selling price of 3.25c. per lb. at the previous bi-monthly settlement. The price of $3.40 per 100 lb., disclosed at the last examination of sales sheets, covers shipments for the period from June 20 to Aug. 20. The puddling rate for the July-August period was $17.26.

Finishing mill operatives received an advance of 7½ per cent. Inasmuch as the current bar iron price in the Chicago district is from $3.50 to $4 per 100 lb. and as high as $5 in the East, it is predicted that the industry has still higher prices ahead of it and that affected employees, who operate on a sliding scale, will benefit proportionately.

The examination was conducted at Youngstown, Ohio, with James H. Nutt acting for the manufacturers and M. F. Tighe, president of the Amalgamated Association, for the men.

Rolling mills and blast furnaces for the manufacture of steel, will it is expected, be established in British Columbia, as soon as the necessary market for the product of such an undertaking has been assured, according to a statement made by Major Martyn, Industrial Commissioner for the Province, who with James H. McVity and Nichol Thompson, of the Advisory Council of the British Columbia Department of Industries, has left for Chicago and San Francisco in connection with the matter.

The Iron Mountain Furnace Co., Iron Mountain, Mich., recently organized with $1,000,000 capital stock to manufacture charcoal, pig iron and chemicals, has abandoned its plan to build a plant at Iron Mountain this year, but expects to commence construction work next spring. M. E. Richards is manager of the company.

The strike at the Howard & Bullough American Machine Co., South Attleboro, Mass., textile machinery, is over, the employees having returned without promise of concession on the part of the management.

Check of Immigration Requires Labor Conservation

In a monograph recently prepared, Frances A. Kellor, vice-chairman Inter-Racial Council, declares that the time has passed when the American employer can count upon an unlimited supply of labor from abroad. Emigration from the countries of Europe will be strictly regulated by the governments in the near future. The French Government has offered Italy 6 tons of coal per month for each Italian miner induced to go to France, and the commissioner of emigration of Italy is advising his people to emigrate to France.

Greece, for instance, is offering inducements of farms to the people, and has passed an act by which large land owners may retain only one-third of their estates, the other two-thirds to be surrendered to the peasants. In Finland areas have been set aside for settlement, and farm implements and supplies are offered to small cultivators on liberal terms.

We should not be deceived by the temporary increase in immigration, declares Miss Kellor. The figures that indicate a large number of arrivals at Ellis Island fail to show the fact that the proportion of women, children, professional and clerical workers is so great as to afford little relief to our labor shortage. Of the manual laborers coming in, a large percentage are men who went abroad to fight and are now returning to their old jobs. Of new workers, to do the essential work of America, there is an exceedingly small percentage, while recent correspondence from all parts of the United States indicates serious shortage of labor in almost every section.

The course of action for the employer is therefore, first, to conserve labor as carefully as he conserves his raw material; second, to regard immigration problems with the same interest that he gives to international commerce, realizing that America is no longer isolated and that what happens in the Old World to-day will be reflected in his own business to-morrow.

Stockholders of the Ohio Steel Products Co., Youngstown, Ohio, have elected the following directors: John A. Logan and George E. Dudley, of Youngstown, and F. W. Mettler, L. M. Cooney and C. E. Doane, of Cleveland. Directors have chosen these officers: F. W. Mettler, president; John A. Logan, vice-president, and C. E. Doane, secretary-treasurer. Mr. Mettler is also president of the Huron Steel Co., Cleveland, which is erecting a tube mill at Huron, Ohio, while Mr. Cooney and Mr. Doane are identified with the same company. The Huron Steel Co. has acquired a substantial financial interest in the Ohio Steel Products Co. and has also agreed to furnish working capital for the completion and operation of a plant at Mineral Ridge, Trumbull county, Ohio, to manufacture conduit and steel tubing.

Machinery Markets and News of the Works

RAILROAD LISTS PENDING

Union Pacific Bought $60,000 Worth—Some to Close Soon

Machine Tool Castings in Cincinnati Increased 50c Per 100 Lb. Because of Higher Coke

Prospective buying by several railroads, mentioned last week, has not yet materialized. However, the Union Pacific has just purchased to the extent of $60,000. The Chicago & Northwestern Railroad has just issued a new list calling for about 50 machines. The Illinois Central, which recently issued a list, has decided to postpone buying. Some significance is attached to several requests from railroads for present prices, together with those prevailing in 1914. It would seem that purchasing departments are thus studying these price statistics to help guide their future.

Foundries in the Cincinnati district which make castings for machine tool builders have increased their prices 50 cents per 100 lb., pointing to the increased cost of coke in particular. Though there is but little change in the prices of machine tools, the tendency is still upward, as evidenced by a 10 per cent raise by a Western lathe maker, an Iowa manufacturer of throatless shears and an Ohio maker of alligator shears.

From Cleveland it is reported that the curtailment in the automotive industries is now felt more than previously and has reached the manufacturer of automotive parts for consumption in Michigan. Some men have been laid off by tool makers in this district. The reduction of the working schedule in Milwaukee has caused a strike of 40 union machinists in a large automotive forge works. Offsetting this is the report of more optimism in Detroit, with fewer cancellations and more inquiries.

Nearly all current business is from small manufacturing plants in single machines of small sizes and from dealers' stocks.

The following are a few more important sales: Sixteen 20-in. engine lathes to a Michigan manufacturer by a Chicago dealer; several tools, including portable grinders, to the Revere Sugar Co., Boston; a large list of second-hand tools to the Rauch & Lang Co., Springfield, Mass., automobiles; a list of lathes, shapers and general line of repair shop equipment for the Everett plant of the Boston Consolidated Gas Co.

The recent Government inquiry for five 40-ton overhead traveling cranes for shipyards at New York, Norfolk and Philadelphia, which was withdrawn once because of insufficient appropriations, will be reissued.

New York

NEW YORK, Sept. 7.

The local machine-tool market has had an unusually quiet week, in which the approach of a holiday probably was of some effect. Aside from the large number of tools wanted by the General Electric Co., which has been increased by inquiries for the Bridgeport works, there is virtually nothing of importance in the market. Railroad buying is expected to come soon, but so far there has been very little in the East.

The crane market continues dull with a fair volume of inquiries, but few sales of importance to record. The recent Government inquiry for five 40-ton overhead traveling cranes for shipyards at New York, Norfolk and Philadelphia, which was withdrawn because of insufficient appropriation, will be reissued. The Electric Bond & Share Co., 71 Broadway, New York, is in the market for a 65-ton overhead traveling crane for a power plant at Shoshone Falls, Idaho. The Newport News Shipbuilding Co., Newport News, Va., is inquiring for a 3-ton jib crane.

Among recent sales were: Shepard Electric Crane & Hoist Co., three 3-ton, 21-ft. span overhead traveling cranes to the Chapman Valve Mfg. Co., Indian Orchard, Mass., and a 4-ton, 60-ft. transfer crane to the Saco-Lowell Shops, Lowell, Mass.; Manning, Maxwell & Moore, Inc., an 8-ton, 25-ft. span hand power crane to the Yukon Gold Co., New York, for Singapore.

The Petroleum Heat & Power Co., 511 Fifth Avenue, New York, manufacturer of oil-burning heating systems, with plant at Stamford, Conn., has acquired 4½ acres at Kings Land Avenue and Newton Creek, Greenpoint, Brooklyn, for about $200,000, which it will use for branch works. A number of buildings are on the site and it is planned to erect other structures. The company, as a going concern, was recently incorporated with a capital of $500,000. The Stamford [illegible] will be extended, and a one-story addition erected to the foundry.

Stephen Ransom, 401 West Street, New York, operating a marine repair works, has filed notice of change of name to the Ransom Dry Dock & Repair Corporation. The [illegible] building a new plant on Hamilton Avenue, Brooklyn, to cost about $250,000, including equipment.

The Crown Chandelier Co., 103 Mott Street, New York, manufacturer of gas and electric fixtures, has increased its capital from $15,000 to $60,000.

Bids have been received by the John J. Riley Co., Van Brunt Street, Brooklyn, manufacturer of iron, brass and other metal castings, for the erection of a one-story brick and steel foundry, 100 x 250 ft., on Columbia Street, near Lorraine Street, to cost in excess of $200,000 with equipment.

The Hudson Tire & Rubber Co., Yonkers, N. Y., is having plans prepared by the Osborn Engineering Co., Prospect Avenue, Cleveland, for a new three-story plant to cost about $350,000. A one-story power plant will also be constructed.

The International Taximeter Corporation, New York, has been incorporated with a capital of $300,000 by E. N. Zorn, E. A. Breck and H. A. Bauer, 814 West End Avenue, to manufacture measuring instruments and precision equipment.

Jacob Ruppert, Inc., New York, 1639 Third Avenue, has filed plans for a two-story machine and automobile repair works, 50 x 200 ft., at 243-45 East Ninetieth Street, to cost about $40,000.

The Transit Construction Commission, 49 Lafayette Street, New York, J. H. Delaney, commissioner, has completed plans for a one-story addition to its machine shops at Lenox Avenue and 148th Street.

The United Electric Light & Power Co., 130 East Fifteenth Street, New York, has acquired an entire block, bounded by Locust and Walnut streets, 132nd and 133rd streets, for about $90,000, to be used as a site for a new electric generating plant.

A new four-story and basement plant to cost about $100,000 with machinery, will be erected by the Eichmann Co., Brooklyn, operating a wood-working plant at 7 McKibbon Street. Plans are being prepared.

The proposed new building of the Newburgh Shipyards, Inc., Newburgh, N. Y., at New Windsor, will be equipped for fabricating steel plates and shapes for use in ship construction. A large crane will be operated along the center of one side of the building and two 80-ft. cranes will be used through the center and west side.

Joseph F. Christe, with temporary address at 209 West Ninety-seventh Street, New York, telephone Riverside 1952, is contemplating the purchase in the United States of machinery for the die casting of metals, especially brass, for Les Usiñes Thécla, St. Ursanne, Switzerland.

The Corona Typewriter Co., Groton, N. Y., manufacturer small model typewriters and parts, has awarded a contract to the Lowman Construction Co., Railroad Avenue, Elmira, N. Y., for a two-story addition, 60 x 150 ft., to cost about $100,000, including equipment. It recently increased its capital from $2,500,000 to $4,000,000. Benn Conger is president.

The Houpert Machine Co., Harris Avenue and Marion Street, Long Island City, has acquired 50 x 95 ft., adjoining its plant, to be used for the erection of an addition.

The McDougall & Potter Co., 606-12 West Fifty-fifth Street, New York, architectural iron specialties, has filed plans for a one-story building at its branch plant, Canal Place and 141st Street, 25 x 223 ft.

The International Western Electric Co., New York, will arrange for the removal of its works at 152-56 West Thirty-sixth Street, after the first of the year. It is occupying the building under lease expiring Jan. 1, 1921, and the property has been acquired by the city of New York for about $300,000, to be used by the Board of Education.

The Ralo Supply Co., New York, has been incorporated with a capital of $100,000 by F. Booth, F. G. Stoehr and C. McLennan, 61 Broadway, to manufacture tanks, boilers and kindred plate equipment.

The M. W. Kellogg Co., 90 West Street, New York, manufacturer of pipe, fittings, etc., is having plans prepared for three one-story buildings in the Droyers Meadow district, Jersey City, N. J., to be operated in conjunction with its present works. A power plant is also contemplated.

The Michelin Tire Co., Milltown, N. J., manufacturer of automobile tires, has awarded a contract to the J. W. Ferguson Co., United Bank Building, Paterson, N. J., for a two-story and basement addition.

The A. C. Motor Truck Co., Rochelle Park, N. J., has been incorporated with a capital of $50,000 by C. S. Bentley, William J. Aitken and H. C. Chambers, Rochelle Park, to manufacture motor trucks and parts.

The Air Reduction Co., 120 Broadway, New York, has awarded a contract to the William Steele & Sons Co., 1600 Arch Street, Philadelphia, for a new one-story mechanical and experimental shop on Schiller Street, Elizabeth, N. J., to cost about $11,000.

The Westville Body Works, Westville, N. J., has been incorporated with a capital of $125,000 by Earl H. and Hagen A. Johnson, and Ambler A. Harling, to manufacture automobile bodies.

The McGarry-Norton Co., East Orange, N. J., has been incorporated with a capital of $125,000 by Patrick J. McGarry, 166 William Street; John J. Norton and Cornelius Shea, to manufacture steam and water fittings, plumbers' supplies, etc.

Charles A. Bergen, receiver for the High Pressure Fitting & Valve Co., 72-76 Putnam Street, Paterson, N. J., will sell the property of the company at public sale Sept. 15, including plant, machinery, foundry apparatus, and other equipment. The property comprising the plant is also being made available for lease.

N. T. Schindler & Co., 66 Hudson Street, Hoboken, N. J., have been organized to manufacture machinery and parts. N. T. Schindler, and A. C. Muller, 75 Sip Avenue, Jersey City, N. J., head the company.

The Essex Foundry, Murray Street, Newark, N. J., has taken out a permit for a one-story brick addition, 60 x 152 ft., to cost about $20,000. It specializes in the manufacture of cast iron pipe.

The Schultz Mfg. Co., 24 Scott Street, Newark, N. J., has been organized to manufacture automobile tools. George A. Schultz, 29 Stratford Place, heads the company.

The Willys Corporation, Newark Avenue, Elizabeth, N. J., has acquired 11 acres in the vicinity of its plant, near the Newark city line, which will be held for purposes other than manufacturing.

The Reliable Electric Co., Newark, has been incorporated with a capital of $100,000 by William Gross, 158 William Street, and Samuel Gross, 124 Littleton Avenue, to manufacture electric appliances and fixtures.

The Aetna Machinery Corporation, 13 Mechanic Street, Newark, has leased the one-story concrete building at 49 Green Street, to be used in connection with its works.

The Tidey Heat Regulating Securities Co., 256 Market Street, Newark, has been organized to manufacture heat regulating devices and equipment. Samuel E. Tidey, 232 Central Avenue, Orange, N. J., and G. W. Oprits, 111 Maplewood Avenue, Maplewood, N. J., head the company.

The New Jersey Gas & Electric Appliance Co., Newark, N. J., recently incorporated to manufacture gas and electric apparatus, has leased property at 36½ New Street, for a plant. Max Gray and H. H. Sklar head the company.

The Eagle Rock Tool & Mfg. Co., 11 Whittlesey Avenue, Orange, N. J., has arranged for the erection of a new shop at 66 Franklin Avenue, West Orange. It was recently incorporated with a capital of $100,000, and is headed by Oscar Mellin and Richard C. Johnson.

The Graphoscope Development Co., Newark, has leased the three-story building at 49-51 Mechanic Street, with floor space aggregating about 40,000 sq. ft., to be used for the manufacture of precision equipment.

The Cole-Birnham-French Co., Newark, has been incorporated with a capital of $100,000 by Mark H. Cole, Bert J. Birnham and William T. French, Jr., 325 Central Avenue, to manufacture machinery and parts.

N. August, Jr., 167 Prince Street, Newark, operating the New Jersey Nipple Machine Works, with plant on Montgomery Street, for the manufacture of iron nipples, pipe fittings, etc., has had plans prepared for a one-story addition to the machine shop, 47 x 51 ft.

The General Welding Co., 398 Market Street, Newark, has been incorporated with a capital of $25,000 by Frank J. and John L. Muench, and Ernest A. Stahl, 99 Niagara Street, to manufacture welding apparatus.

The Westville Lifeboat Building Co., Westville, N. J., has been incorporated with a capital of $125,000 by Earl H. and Hagen A. Johnson, to manufacture life boats, fittings, etc.

New England

BOSTON, Sept. 6.

Two or three local companies report August bookings in excess of expectations, but the general machine tool business that month was considerably less than for July. Orders since Sept. 1 have been few. Prices hold very strong, especially on motor-driven equipment. Deliveries are still extended, although the situation appears to be much better than at the close of the first six months. Several dealers, however, who have sold equipment on specified dates of shipment, have been unable to make deliveries.

The majority of New England machine-tool builders report a falling off in business from other sections of the country, but a few note increased sales, due to buying by some of the Western railroads. So far as can be learned the New England railroads will not buy shop equipment for some time at least, and the few car building concerns in this section have signified their intention to get along with the equipment they have. Local machine-tool interests, therefore, are concentrating their efforts on mills and manufacturers in general, and there appears to be enough prospective business in sight to warrant a belief that September bookings will show up comparatively well. At the moment there is a good going business in repair parts, chucks and small tools. Machine shop work has slowed up noticeably and proprietors are taking advantage of conditions to make much needed repairs and parts replacements.

The Revere Sugar Co., Boston, has bought a gap lathe, bolt cutter, small power hammer and several portable grinders. The Lane Mfg. Co., Montpelier, Vt., has bought additional 20-in. upright drill press equipment. This company is exceptionally busy on marble machinery. The Central Gas & Oil Stove Co., Gardner, Mass., has covered its compressor requirements. The General Electric Co., West Lynn, Mass., has not started to buy against its recently issued list.

The Saco-Lowell Works, Boston, is in the market for a vertical milling machine and also is inquiring on a second-hand three-spindle drill. The International Woodworking Machine Co., Dover, N. H., wants a 60 in. x 60 in. x 20 ft. planer for bulky but light work. This company issued a list of new equipment needed about a month or so ago, but will not act on it for some time. The Mechanical Rubber Mfg. Co., Andover, Mass., wants a grinder for grinding rubber-covered pullies, and a representative of a new Texas machine shop is inquiring on one 20-in. and one 14-in. lathe, a shaper, milling machine and other equipment.

The second-hand machine tool business holds up well. The Rauch & Lang Co., Springfield, Mass., automobiles, has bought a large amount of second-hand production equipment. It has not completed its list, but has discontinued purchases. The Boston Consolidated Gas Co., Boston, has bought lathes, shapers and a general line of repair shop equipment for its Everett plant and the Boston Forge Co., East Boston, a large lathe. The Simonds Machine Co., Albany, bought 10 lathes from a local dealer, who also completed sales to other New York State dealers. A Two

River, Wis., company is inquiring for screw machine equipment; Greensboro, N. C., and Baltimore, Md., for lathes, and Milwaukee interests for planers.

The Whitinsville Spinning Ring Co., Whitinsville, Mass., has let a contract for a one-story addition. Another small extension will be made later.

J. H. Sessions & Son., Bristol, Conn., trunk hardware, are completing two additions to their factory, which will not only allow for increased production of their standard product, but also give additional room for some special lines, such as stampings, washers, burrs, rivets, etc.

The Underwood Typewriter Co., Hartford, Conn., will not operate its recently acquired Bridgeport plant at capacity for some time. It is probable that a large part of the machinery now used in Hartford for the manufacture of small portable typewriters will be sent to the new plant. W. A. Campbell will be in charge of equipping the buildings and providing a working force.

The Thomas Smith Co., Worcester, Mass., metal punches and bolts, will purchase the new weaving branch of the Jefferson Mfg. Co., Grove Street, which has been closed for several months. The building is one-story and contains 7600 sq. ft. of floor space. The company will move from its present location to its new property and contemplates the erection of a plant in the rear. Frank H. Howard is general manager.

The Massachusetts Blower Co., Watertown, Mass., fans, blowers, heaters, etc., is operating a new machine and structural department for ornamental iron work, etc. C. V. Greene, who was connected with the New England Structural Co., Boston, for 15 years, is in charge of the structural shop. The company employs about 100 men.

Bids have been received by the Somerset Stove Foundry, Somerset, Mass., for the erection of a one-story foundry, 70 x 160 f., to cost approximately $50,000.

The Smith Paper Co., Lee, Mass., has started the erection of a one-story addition, 66 x 162 ft., to its machine room.

Nelson & Nordwell, machinists, 69 Water Street, Worcester, Mass., have removed to 42 Southbridge Street, where considerably more floor space is available. Additional machinery and equipment are to be installed. Associated with the company are Richard E. Nelson and Albert G. Nelson, formerly with the Heald Machine Co., and Henry M. Nordwell, formerly with the Culver-Stearns Mfg. Co.

The Bayside Foundry Co., Fall River, Mass., with a capital of $300,000, consisting of 3000 shares of common stock, par $100, 220 of which are issued, has been incorporated to take over the plant of the Mechanics Foundry & Machine Co., that city, which will have a daily capacity of 15 tons. Possession was taken Sept. 1. Jerome P. Fogwell, 518 Osborn Street, Fall River, is president of the new company, and Junius P. Sokell, 176 Shawmut Street, treasurer.

The National Collapsible Tube Co., 362 Carpenter Street, Providence, R. I., has filed plans for a new one-story shop.

The North & Judd Mfg. Co., New Britain, Conn., manufacturer of hardware specialities, has increased its capital stock $500,000, making the total outstanding stock $2,000,000.

The P. Jahn Mfg. Co., New Britain, Conn., manufacturer of tools, dies, etc., has completed plans for a two-story addition, 40 x 150 ft., to cost about $50,000. G. A. Zunner, 756 Main Street, Hardford, Conn., is architect.

The Vera Air Compressor Co., 886 Main Street, Bridgeport, Conn., has been organized to manufacture air compressors and kindred products. S. C. Gould is vice-president.

The Palmer Foundry & Machine Co., Foundry Street, Palmer, Mass., manufacturer of hat pressing machinery, etc., has commenced the rebuilding of its foundry, recently damaged by fire.

R. C. Waterman & Co., South Hanover, Mass., manufacturers of nails, etc., have awarded all miscellaneous contracts for a one-story addition, 80 x 120 ft., to cost about $75,000.

A one-story power plant, 44 x 133 ft., will be erected by the American Printing Co., Water Street, Fall River, Mass., in connection with an addition to its textile plant. The entire work is estimated to cost about $165,000.

The Universal Winding Co., Auburn, R. I., manufacturer of textile machinery and parts, has filed plans for a three-story, brick and steel addition, to cost about $175,000. The C. I. Higney Construction Co., 357 Westminster Street, Providence, has the contract.

The General Electric Co., West Lynn, Mass., has purchased the five-story, 60 x 242 ft. Randall-Faichney plant, 76 Atherton Street, Roxbury, Boston, together with a large power plant. The Randall-Faichney Co., made automobile gages, etc.

The Atlas Tack Co., Fairhaven, Mass., has bought the assets and good will of the Caseley & Nelmes Co., Brockton, eyelets. The Atlas Company has purchased sufficient equipment to increase the production of its shoe lacing hook department approximately 100 per cent.

Philadelphia

PHILADELPHIA, Sept. 6.

The Philadelphia Roll & Machine Co., Fifty-second Street and Gray's Avenue, Philadelphia, has filed plans for an addition to its machine shop to cost $50,000.

The Philadelphia Gas Range Co., Thirteenth and Arch streets, Philadelphia, manufacturer of heating equipment, etc., has increased its capital from $50,000 to $100,000.

The McCaffrey File Co., Fifth and Berks streets, Philadelphia, has awarded a contract to the Robbins Construction Co., 1137 North Front Street, for a two-story building, 80 x 87 ft., to cost about $50,000.

The Federal Container Co., Philadelphia, has had plans prepared by LeRoy B. Rothschild, architect, 1225 Sansom Street, for a new one-story brick and steel plant, 198 x 311 ft., at Tioga and Thompson streets.

The Budd Grate Co., 2013 East Latterly Street, Philadelphia, manufacturer of grates, grate bars, etc., has filed plans for a one-story building at 2011 Adams Street.

J. M. Kennedy, Jr., 4068 South Van Pelt Street, Philadelphia, has filed plans for a one-story machine shop at Island and Tinicum Roads.

The one-story machine shop to be erected by the National Umbrella Frame Co., Thirtieth and Thompson streets, on Belfield Avenue, near Penn Street, will cost about $10,000 and will be used for wire and metal working. George W. Whitenar, 403 East Penn Street, has the contract.

At a special meeting of stockholders of the Hale & Kilburn Corporation, Eighteenth and Lehigh streets, Philadelphia, manufacturer of steel automobile bodies, railroad equipment, etc., the merger of the company with the Wadsworth Mfg. Co., Detroit, manufacturer of similar products, was approved. The combined company will be operated in the name of the American Motor Body Corporation. The Hale & Kilburn Co. will maintain its corporate existence.

The Peters Motor Corporation, Trenton, N. J., recently organized, is planning for the establishment of a local plant for the manufacture of a popular-priced automobile. A site is now being selected and details of the project are being arranged. Preliminary work has been conducted at the factory of Fitzgibbon & Crisp, Inc., Calhoun and Durnham streets, manufacturer of automobile bodies, covering experimental cars. E. James Peters,, Pleasantville, N. J., is president, and James P. Cubberly, 111 West State Street, Trenton, vice-president.

The Polar King Corporation, Camden, N. J., has been incorporated with a capital of $500,000 by Harry Decker, Camden; Frank E. Williams, Gloucester City, N. J., and Edward Zoller, Colwyn, Pa., to manufacture refrigerating machinery and ice-making equipment.

The Reading Steel Castings Co., Reading, Pa., has completed plans for a one-story machine shop, to cost about $150,000, including equipment.

The Hamburg Foundry Co., Washington Street, Hamburg, Pa., has awarded contract to A. J. Ranbenhold, Hamburg, for an addition, one-story, 20 x 40 feet, and 18 x 20 ft.

The Keeley Stove Co. Columbia, Pa., manufacturer of stoves, heaters, ranges, etc., has increased its capital from $300,000 to $750,000. It is planning for the erection of a four-story and basement addition on North Second Street.

The Ford Motor Co., Detroit, is considering the establishment of a new factory branch at Williamsport, Pa., to be equipped for assembling and other features. The proposed works will be used for service throughout this district.

The Easton Automobile Co., Third and Snyder streets, Easton, Pa., is taking bids for a new one-story service building and repair works, 65 x 150 ft., to cost about $65,000.

The Cook & Robbins Coal Co., Brownsville, Pa., has had plans prepared for the erection of a new steel tipple.

The New Era Hydro-Electric Co., Mechanicsburg, Pa., recently incorporated with a capital of $250,000, is planning for the establishment of a new hydro-electric power plant in this section. The company is headed by Arthur C. Watkins, Mechanicsburg; Clem J. Randel, Harrisburg, Pa., and R. C. Douglas, New Market, Pa.

Equipment for instruction in machine shop, foundry, forge shop and other mechanical work will be installed in the manual training department at the new three-story high school to be erected by the Board of Education, New Castle, Pa. It is estimated to cost in excess of $600,000 with equipment.

The Rouillard Tool Corporation, formerly at 608 Chestnut Street, Philadelphia, has been reorganized as the Dawson-

Rouillard Tool Corporation, with factory and offices at Fifty-first Street and Lancaster Avenue, Philadelphia. In addition to handling the Rouillard tool holders the company will manufacture rivet sets, invented by J. W. Dawson, and a line of small tools and forgings, including punches, chisels, reamers, calipers, pistons, hammers, tongs, and special tools. J. W. Dawson is president of the new company; W. A Schurmann, secretary and treasurer, and P. H. Rouillard, vice-president. W. F. Kline is superintendent.

Chicago

CHICAGO, Sept. 7.

The Union Pacific has bought about $60,000 worth of tools against the list recently published in this column. In connection with the Illinois Central inquiry, which was expected to be closed the past week, an unlooked-for but, it is believed, temporary delay has developed. Buying against the Santa Fe and the Northwestern lists is also expected soon. Railroad equipment manufacturers are purchasing a few tools almost every week, but invariably they want machines on which immediate delivery can be secured. The American Steel Foundries and the General American Tank Car Corporation have been among purchasers of this class.

Generally speaking, the market remains dull, although orders for single machines continue to be received from miscellaneous consumers, principally outside the automotive field. Occasionally a good-sized order is booked, as, for instance, an order for 16 20-in. engine lathes received by a local dealer from a Michigan manufacturer. Prices are practically unchanged, although a few open lines have advanced, 10 per cent raises having been announced by a Western manufacturer of lathes, an Iowa maker of throatless shears and by an Ohio manufacturer of alligator shears.

For the first time since February, the number of building permits taken out in one month in Chicago is greater than that of a corresponding period in 1919. Permits were granted in August for 308 buildings fronting 10,752 ft., involving a total estimated cost of $5,521,000 as against 288 permits, with a total frontage of 9,318 ft. and a cost of $4,960,400, for the same month a year ago.

The Coca-Cola Co., Atlanta, Ga., has purchased a block bounded by Crawford Avenue, Fillmore Street, Karlov Avenue and the Baltimore & Ohio Chicago Terminal Railroad, Chicago, and will erect manufacturing buildings to cost $1,000,000.

The Fryac Mfg. Co., manufacturer of the Fryac spark plug, Rockford, Ill., will erect a four-story plant on Eighth Street, between Nineteenth and Twentieth avenues, next spring. The site has been bought and the building will cost $100,000.

The new plant of the Sterling Washing Machine Co., DeKalb, Ill., has been practically completed.

The Phoenix Foundry Co., Burlington, Iowa, recently organized, has commenced operations in a plant on Osborn Street, near Central Avenue. Brass, bronze and aluminum castings will be manufactured. W. T. Chambers is president.

The Corn Products Refining Co., Jersey City, N. J., has purchased a 75-acre site in North Kansas City, Mo., and will construct a branch plant to cost from $7,000,000 to $8,000,000.

The plant of the Gray Iron Foundry, Muskegon, Mich., was recently damaged by fire with an estimated loss of $20,000.

The plant of the American Malleables Co., Owosso, Mich., was recently damaged by fire, the loss being about $25,000. The company plans the erection of a new core room, double the size of the one destroyed.

The Watters & Portman Wheel Co., Sturgis, Mich., contemplates the erection of an addition.

The Greensburg Foundry Co., Greensburg, Ind., has removed its plant to Shelbyville. G. W. Wagner, formerly general manager the Whitely Malleable Castings Co., has been elected president, and J. Edward Evans continues as secretary-treasurer.

The Metal Products Co., Plymouth, Ind., contemplates the erection of an enameling plant, 32 x 48 ft., to serve its automobile radiator factory.

The Argus Mfg. Co., 402 North Paulina Street, Chicago, manufacturer of pencil clips and similar specialties, is taking bids for its one-story plant at Kildare and Division streets, 125 x 170 ft., to cost about $75,000.

The Western Mfg. Co., Evans Block, Denver, Col., manufacturer of locks, bolts and other hardware products, is arranging for the erection of a new plant to cost about $200,000, including equipment.

The Altenburg Tire & Rubber Co., 1227 East River Street, Davenport, Iowa, has awarded contract to Blunk & Joehnke, 1114 West Fifteenth Street, for a one-story foundry and machine shop on Rockingham Road, 75 x 125 ft., to cost about $25,000.

The Victor Heater Co., Marshalltown, Iowa, manufacturer of heaters and heating equipment, has filed plans for three one-story additions, to provide about 48,000 sq. ft. of floor space.

The Western Electric Co., Hawthorne, Ill., has awarded a contract to James Sheldon, 106 South La Salle Street, Chicago, for a new plant at Cicero, Ill., at Forty-eighth Avenue and Twenty-fourth Street, to cost in excess of $1,000,000, including equipment.

The Gerard Mfg. Co., 1942 South Fifty-second Avenue, Chicago, has started production in a new plant, 100 x 675 ft. It manufactures wire tying machines, which will be distributed by the Gerard Wire Tying Machine Co.

The American Wire Fabrics Co., 208 South La Salle Street, Chicago, has opened a new plant at Blue Island, Ill.

The Savage & Love Co., manufacturer of a centrifugal pump and general mill and factory supplies, Rockford, Ill., contemplates removing its plant to Michigan City, Ind.

The Quality Aluminum Castings Co., Muskegon Heights, Mich., recently incorporated with $40,000 capital stock, has started production in a new plant, 30 x 75 ft. It will do general aluminum casting work with special attention to pattern castings. S. A. Feltman, for 10 years superintendent Enterprise Brass Works, Mulskegon, is president and general manager; Edward P. Neagle vice-president; Robert Worden, secretary, and Bernard Weir, treasurer.

The Universal Machine & Tool Corporation, 4146-52 West Taylor Street, Chicago, has purchased the northeast corner of Fullerton Avenue and Kenton Street, 134 x 225 ft., and will build a two-story plant, to cost $100,000.

The Chicago Bearing Metal Co., 2334 West Forthy-third Street, Chicago, has let contract for a one-story factory, 47 x 93 ft., to cost $10,000.

The Mechanical Mfg. Co., Union Stock Yards, Chicago, has let contract for a one-story compressor house, 26 x 33 ft., to cost $3,700.

The Acme Metal Products Co., 1211 Clybourn Avenue, Chicago, will erect a one-story boiler room addition, 21 x27 ft., to cost $3,500.

The Fort Madison Foundry Co., Fort Madison, Iowa, has been incorporated with $25,000 capital stock by William F. Boekenkamp and others.

Buffalo

BUFFALO, Sept. 6.

The Buffalo Foundry & Machine Co., Fillmore Avenue and East Ferry Street, Buffalo, is taking bids for a one-story foundry, 38 x 80 ft., to cost in excess of $100,000, including equipment, and two-story pattern shop, 50 x 70 ft., to cost about $25,000. H. D. Miles is president and treasurer.

The Republic Metalware Co., 100 Alabama Street, Buffalo, manufacturer of galvanized metal utensils, has increased its capital from $1,750,000 to $2,625,000.

The State Hospital Commission, Albany, N. Y., is taking bids up to Sept. 29 for new coal and ash-handling equipment for installation at the State Hospital, Buffalo. L. F. Pilcher is State architect.

In connection with its new automobile service building at 1118-30 Main Street, Buffalo, the Kam-Kaderbeck Co. will establish a machine shop for parts production and repair work. Construction is under way and the company plans to occupy the building at an early date.

The Bartlett Hardware Co., Cuba, N. Y., has been incorporated with a capital of $50,000 by J. G. Bartlett, G. L. Hendryx and E. E. Johnston, to manufacture hardware specialties and tools.

The New York Central Railroad, Syracuse, N. Y., is considering tentative plans for a new engine house and locomotive repair shops in the vicinity of Solvay, N. Y.

A two-story power plant, 52 x 200 ft., to cost about $150,000 with equipment, will be erected by the Standard Oil Co., 1103 Elk Street, Buffalo.

The Ogden R. Adams Mfg. Co., 159 St. Paul Street, Rochester, N. Y., manufacturer of metal working machinery, has filed notice of dissolution under New York laws.

The Continental Heater Co., Dunkirk, N. Y., has awarded contract for the superstructure of the new two-story building at its plant on Otter Street, to the Dunkirk Mason & Contracting Co., 302 Central Avenue. It will be 31 x 69 ft., and is estimated to cost about $20,000.

Cincinnati

CINCINNATI, Sept. 6.

The local machine tool trade is very quiet. While most of the shops are busy on old orders the volume of new business booked is light. Some cancellations and requests for suspension of shipments are still being received. Scattered railroad buying continues, but no large purchases are expected from this source until after the first of the year, although many requests for prices have been received. With these requests some roads are asking information as to prices prevailing in 1914. Why these figures are wanted is causing some speculation in machine tool circles. It is understood that the Illinois Central Railroad, which recently issued a list, has decided to postpone purchases, at least temporarily. Local foundries making castings for machine tool manufacturers have increased their prices 50 cents per 100 lb. The explanation for this is higher costs of production, particularly the increased cost of coke, etc.

The Clifton-Pratt Co., 1224 West Eighth Street, Cincinnati, is in the market for a crane runway with 10-ton traveling crane, preferably second hand, 40 ft. span. The runway is to be 30 to 40 ft. high and 400 to 500 ft. long.

The Weir Frog Co., Norwood, Ohio, has purchased six acres adjoining its present plant, but no extensions are contemplated in the near future.

Two bids were received by the Navy Department, Washington, for the purchase of the naval ordnance plant at Dayton, Ohio. The highest offer was from John F. Ohmer, Dayton, whose bid was $144,000. No action has yet been taken by the department.

The Ohio Municipal Equipment Co., Columbus, Ohio, has been incorporated with a capitalization of $1,000,000. It will manufacture vacuum street sweepers and has taken over the plant of the C. B. Vacuum Street Cleaner Co., 62 Prescott Street, the latter to be merged with the new concern. John Bass is president.

The Kelly Nail & Iron Co., Monroe Street, Ironton, Ohio, is having plans prepared for a one-sory and basement power plant, 40 x 60 ft. Ralph Murray, Masonic Temple, is architect.

The Hill & Griffith Co., 1252 State Street, Cincinnati, manufacturer of foundry equipment, is arranging for the erection of a new one and four-story plant, 150 x 300 ft., to cost about $100,000. B. L. Baldwin, Second National Bank Building, is architect.

The Safe Cabinet Co., Norwood, Ohio, manufacturer of metal cabinets, safes, etc., has taken bids for a one-story addition, 80 x 150 ft.

The Springfield Malleable Iron Co., Springfield, Ohio, has awarded contract to the Concrete-Steel Construction Co., Mitchell Building, for a new two-story and basement building.

Cleveland

CLEVELAND, Sept. 6.

Practically all orders for machinery in this section are coming from small manufacturing plants and the demand is almost wholly for single machines in small sizes which are being purchased from dealers' stocks. Aside from an occasional single order nothing is being heard from the railroads. The curtailment of the automobile industry is being felt more in this city now than previously, owing to the fact that the effect of the slowing down has more generally reached manufacturers of automobile parts who ship much of their product to the Michigan territory. The holding up of orders for automobile castings has resulted in the sharp curtailment of operations by some local foundries which cater to the automobile trade.

The slowing down of the demand for machine tools has also resulted in the laying off of men in some Cleveland plants. In foundry equipment, manufacturers of molding machines report that cancellations have been few. While there is a general feeling that business will improve in the automobile industry when the financial situation eases up, machinery men are not very hopeful that much business will come from this source for the next year. Many automobile companies largely increased their capacities this year and further extensions are not looked for as it is probable that the capacity of plants at present is sufficient to meet all demands.

Steel mills are not buying equipment but there is some demand for gas producers from the glass industry. Western railroads are also buying some equipment.

The erection of a plant in Delaware, Ohio, for the manufacture of plumbers' brass goods is being planned by interests associated with the Atlas Brass Co., Cleveland. The company will be incorporated with a capital stock of $125,000 and will be known as the Delaware Brass Co. The same interests control the Regent Brass Co., Marysville, Ohio. It is stated that equipment amounting to $75,000 has been placed.

The Canton Pattern & Mfg. Co., Canton, Ohio, will erect a new plant, 75 x 120 ft.

The Acklin Stamping Co., Toledo, Ohio, has acquired a site on Nebraska Avenue and will build a new plant to employ about 750 men or three times the present number. Plans provide for punch press, annealing furnace, nickel-plating, galvanizing, electric welding and tool departments, and a warehouse with capacity for 50,000 tons of steel. The capital stock will be increased from $50,000 to $500,000. James M. Acklin is vice-president and general manager and William C. Acklin, secretary and treasurer.

The Commercial Shearing & Stamping Co., Youngstown, Ohio, has increased its capital stock from $100,000 to $350,000 to finance the construction of a new plant which is nearing completion. Robert Carnick is president, and George C. Tinsley, general manager.

The Shelby Wire Co., Shelby, Ohio, is installing a department for drawing and annealing wire used in its plant. To provide for the extension its capital stock has been increased from $35,000 to $75,000.

The Cloyes Gear Works, Cleveland, has been organized by R. T. Cloyes, formerly sales manager of the Lees-Bradner Co., Cleveland, and has established a plant at 7708 Quincy Avenue which will engage in gear cutting and thread milling.

The Elyria Iron & Steel Co., Cleveland, increased its capital stock from $1,500,000 to $3,500,000 and has under consideration extensions to one of its departments.

The Light Alloys Co., Painesville, Ohio, has awarded contract to the H. K. Ferguson Co., 6532 Euclid Avenue, Cleveland, for a one-story building, 75 x 140 ft., to cost about $65,000.

Contract will shortly be awarded by the Champion Engineering Co., Kenton, Ohio, for the erection of a 500-ft. addition to its grey iron foundry, which is 115 x 181 ft. Bids are also being received on the equipment. The new buildings, under construction for some time, which will double the present capacity of the plant, will be opened about Sept 15.

Baltimore

BALTIMORE, Sept. 6.

The American Can Co., 120 Broadway, New York, is completing plans for its new plant, brick, steel and concrete, at Baltimore, to cost about $500,000, including equipment.

The Norfolk & Western Railway, Norfolk, Va., is said to be planning for the construction of new locomotive and car shops near the Downsville Pike, Hagerstown, Md. W. J. Jenks is general manager.

The Republic Belting Co., 2133 Pratt Street, Baltimore, has awarded contract to John E. Marshall & Son, 117 South Street, for an addition to its three-story plant to cost about $25,000. Improvements will also be made in the present works.

The Alenite Lubricator Co. of Maryland, 106 West Mount Royal Avenue, Baltimore, has been incorporated with a capital of $50,000 by Samuel K. Smith, Charles F. Eck and Ernest W. Beatty, to manufacture lubricating devices, automobile oiling equipment, etc.

The McNamara Brothers Co., Inc., Kloman Street, Westport, Md., manufacturer of tanks, boiler equipment, etc., will soon take bids for an addition, 80 x 200 ft., to cost about $25,000. H. F. Doelmann, 507 North Charles Street, Baltimore, is architect.

The Gerhart Brass Foundry, 1301 Fidelity Building, Baltimore, has been organized to manufacture brass, bronze and other metal castings. George B. Gerhart and John D. Nock head the company.

E. C. Caldwell, Greensboro, N. C., and J. K. Caldwell, Galax, Va., have organized a company to build a new hydroelectric power plant on the Dan River, near Galax. It will have a capacity of about 10,000 hp. and is estimated to cost $500,000, including machinery. Professor Seville, University of North Carolina, Chapel Hill, N. C., is engineer in charge.

The Travelers' Garage, Norfolk, Va., has had plans prepared for a new three-story service building and repair works, 120 x 235 ft., to cost about $200,000, including equipment. B. G. Tunstall is treasurer.

Considerable mechanical and electrical equipment will be installed in the new paper and pulp mill to be erected by the Champion Fiber Co., Canton, N. C., estimated to cost in excess of $1,000,000, including equipment.

The Marine Iron Works Co., Inc., Berkley, Va., is having plans prepared for a two-story machine shop, 60 x 175

ft., to cost about $75,000. R. O. Colonna is president.

The General Electric Co., which took over one of the plants formerly used by the Bartlett-Hayward Co., Baltimore, will erect a one-story brick building to cost $18,000, to be used as a blacksmith shop, etc.

The Cambridge Mechanical Toy Co., Cambridge, Md., has been incorporated with $25,000 capital stock. The incorporators are Thomas J. Levy, Robert H. Matthews and Edgar Harrington.

The Norton Armature Works, Norton, Va., recently incorporated with $5,000 capital stock, has leased a building and will install lathes and other machinery for electrical work. A. P. Spracher is secretary. Prices are wanted on equipment.

Morgan College, Hillen Road and Arlington Avenue, Baltimore, has awarded contract for a one-story brick power house, 42 x 52 ft., to cost $33,000.

Plans are being prepared by the Baltimore Malleable Iron & Steel Casting Co., Charles and Wells streets, Baltimore, for extensions and the installation of furnaces, etc., to cost about $100,000. Further additions are contemplated later.

Plans of the Standard Oil Co., Baltimore, are understood to embody extensions in its refinery at Canton, Baltimore, which will cost about $7,000,000.

Indiana

INDIANAPOLIS, Sept. 6.

The Mutual Truck Co., Sullivan, Ind., manufacturer of motor trucks, has awarded contract to the M. J. Hoffman Construction Co., Evansville, Ind., for a two-story building, 80 x 100 ft., to cost about $75,000.

Fire, Aug. 18, destroyed a portion of the plant of the Varney Electric Co., Evansville, Ind., manufacturer of electrical equipment, with loss reported at $100,000.

The Pioneer Truck Co., Valparaiso, Ind., is contemplating the erection of a new one-story plant for the manufacture of automobile trucks, 100 x 300 ft., to cost about $100,000 including equipment. O. M. Frier is president.

The Marion Insulated Wire & Rubber Co., Marion, Ind., has awarded a contract to G. W. Heinzman, Marion, for a three-story and basement addition, 35 x 60 ft.

The Metals Refining Co., 627 Hohman Street, Hammond, Ind., is taking bids for a one-story and basement building on Summer Street, to cost about $25,000.

The E. W. Steinhart Co., Eleventh Street, Indianapolis, has completed plans for a five-story automobile service and repair building, 110 x 125 ft., on North Meridan Street, to cost about $400,000.

The Young Pump Co., 327 South La Salle Street, Chicago, manufacturer of pumping machinery and parts, has awarded a contract to the Michigan City Construction & Investment Co., Michigan City, Ind., for a one-story plant on Second Street, Michigan City, 60 x 300 ft. H. Young is president.

The Carrol Castings Co., East Chicago, Ind., has acquired property fronting on the Indiana Harbor Belt Railroad for a new plant.

The Griffith Foundry Co., 582 Oakley Avenue, Griffith, Ind., has completed arrangements for a new one-story plant unit, 90 x 225 ft., to cost about $50,000. It will be used for malleable iron working.

Pittsburgh

PITTSBURGH, Sept. 6.

Extreme dullness has characterized the demand for machinery and equipment in this district the past week. Nothing of interest has developed in cranes, and the number of inquiries put out weeks and even months ago do not appear much nearer the closing stage. Distributers of lathes, grinders and tools in general, report a fair demand for individual pieces from stock, but no orders of any consequence. An advance of 15 per cent has been announced in Williams pipe-threading machines, while the United States Electrical Tool Co., which sells its machines with motors attached, has withdrawn its old lists and now is making quotations only on application. Action by the latter company is said to have been forced by the recent steep advance in motors by the several makers.

The Copper Clad Steel Co., Arrott Building, Pittsburgh, is planning for an increase in its capital from $400,000 to $600,000.

The Pittsburgh Forge & Iron Co., Chamber of Commerce Building, Pittsburgh, manufacturer of iron and steel bars, etc., has completed plans for a two-story addition, 35 x 88 ft., and 18 x 22 ft., to cost about $40,000.

The King Motor Co., Bedford, Pa., has had plans prepared for a two-story and basement service and repair plant, 60 x 295 ft. S. A. Marstellar, Third Avenue and Wood Street, Pittsburgh, is architect.

The Warren Gear Products Co., Warren, Pa., has been incorporated with a capital of $700,000 to manufacture gears and transmission equipment for automobile and other service. U. S. Rogers is treasurer.

The Kittanning Iron & Steel Co., Kittanning, Pa., is having plans prepared for a one-story addition, to cost about $100,000. The Arthur G. McKee Co., 2422 Euclid Avenue, Cleveland, is architect and engineer.

The P. H. Murphy Co., New Kensington, Pa., manufacturer of railroad equipment and supplies, is taking bids for a new one-story plant at Plumb Creek, 73 x 700 ft. J. T. Desmond is general manager.

The Gearhart Knitting Machine Co., Clearfield, Pa., has been incorporated with a capital of $30,000 to manufacture textile machinery and parts. J. E. Gearhart is treasurer.

The Domestic Refrigerating Co., Coraopolis, Pa., has awarded contract to the Duquesne Construction Co., Bessemer Building, Pittsburgh, for a new one-story plant, 60 x 100 ft., for the manufacture of refrigerating equipment.

Engines, cars, logging equipment, sawmill and other machinery will be installed by the Ritter Hardwood Lumber Co., 111 First National Bank Building, Huntington, W. Va., at its proposed new plant. The installation is estimated to cost about $100,000. C. L. Ritter is president; B. B Burns, vice-president, treasurer and manager.

Bids for buildings and equipment will soon be asked by the National Shale Brick Co., Queen Street, Martinsburg, W. Va., for its proposed plant, to cost, including machinery, about $200,000. F. V. Alvers is president.

Catalogs Wanted

The Pabody Supply Co., mine, mill and foundry supplies, has moved its offices from 402 Blackstone Building to 431 Wabash Building, Pittsburgh, and desires catalogs, lists, prices and full information on mine, mill, foundry and factory supplies, sheet steel, copper, brass and aluminum sheets, sheet zinc, pig tin and lead, manila, sisal and wire rope, composition roofings, building papers, and preservative paints, babbitt metals, solder and soldering fluxes, cast iron, wrought and steel pipe and fittings, bolts, lag, machine and set screws, etc.

Detroit

DETROIT, Sept. 6.

A feeling of optimism appears to prevail among machine tool dealers in this district which was not so apparent a week ago. While the market remains inactive, dealers state cancellations are fewer and inquiries are increasing. Largely increased market activity, however, is not expected for several months.

The George V. Candler Co., Detroit, is considering tentative plans to increase its facilities, owing to the growth of its business.

The American Furnace & Foundry Co. has been recently organized by a group of business men in Milan, Mich., and has orders on its books valued at $500,000 which will keep it operating at capacity until 1922. It will manufacture a newly designed heating furnace.

The Case Mfg. Co., Jackson, Mich., has moved from 114 Liberty Street to larger quarters at 214-216 North Mechanic Street, where a three-story building has been remodeled with more than 30,000 sq. ft. of floor space. An increase of more than 200 per cent in business in the last year made the move necessary.

The Sauzedde Wire Wheel Co., Mount Clemens, Mich., has advertised for bids on the construction of its new plant, which it is hoped to have in operation some time this fall.

An addition, 24 x 50 ft., is under construction at the plant of the Clark Equipment Co., Berrien Springs, Mich. It is reported that its Buchanan plant will hereafter be devoted entirely to the manufacture of motor axles, while the manufacture of drills will be concentrated at the Berrien Springs plant.

New contracts recently received by the Gerson-Carey Co., Lansing, Mich., will keep the plant operating at capacity until the beginning of 1921. It is stated there is an especially heavy demand for the products of the brass foundry.

The Wood Hydraulic Hoist & Body Co., 1789 Hartwick Avenue, Detroit, will build a brick and steel factory in the near future.

Loss estimated at $200,000 was sustained by the Gray Iron Foundry, Muskegon, Mich., a few days ago, when fire destroyed the core and molding rooms.

Joseph N. Smith & Co., Detroit, manufacturers of auto-

mobile hardware, contemplate making extensions to the present plant.

The Brass Products Co., 1067 East Palmer Avenue, Detroit, has filed plans for a new one-story factory, 30 x 95 ft., to cost about $16,000.

The Economy Boiler Co., Ann Arbor, Mich., has completed plans for the erection of a one-story building on Main Street, 67 x 130 ft., to cost about $25,000.

The Pere Marquette Railroad, Union Depot, Detroit, is considering the erection of new shops and engine house at New Buffalo, Mich.

The Standards Steel Products Co., Lansing, Mich., has been incorporated with a capital of $20,000 by E. H. Refeor, B. Sherwood and Charles W. Nichols, to manufacture iron and steel products for automobile and other service.

The Union Welding Co., 842 West Jefferson Avenue, Detroit, will install new equipment and enlarge its plant. It specializes in the welding of gray iron castings and similar work.

The Detroit Machine Tool Co., Detroit, Mich., advises that it has recently been erroneously referred to as the Detroit Tool Co. On May 1 the company changed its name from the Detroit Tool Co. to the Detroit Machine Tool Co.

Milwaukee

MILWAUKEE, Sept. 6.

While the machine-tool business remains without feature, a slight improvement is noted in some quarters in new business and inquiry. Orders are of small volume and consist largely of single tools for replacement or piecing out equipment. Railroad interest appears to be growing, but lists are slow in closing. Automotive shops are buying sparingly, if at all. Local manufacturers are maintaining production at a normal rate and in most cases have sufficient business to keep busy until the end of the year. Some machine shops specializing in automobile work have been compelled to reduce working schedules. This resulted in a strike of 40 union machinists employed by a large automotive forge works. Otherwise the labor situation is tranquil.

The Appleton Machine Co., Appleton, Wis., is effecting a reorganization for the purpose of materially enlarging operations. The capital stock will be increased from $100,000 to $500,000 to finance the construction and equipment of a new plant and the conversion of the present shops into a hydroelectric generating plant with steam auxiliary. It is likely that work will begin shortly after Jan. 1. The company manufactures paper mill machinery, including centrifugal pumps, Jordan engines, wood splitters, wet machines, screens, screening grinders, chip screens, chippers and friction feed wood sawing machines. In the pump department the company is about 400 units behind on orders. Herman G. Saecker is secretary and treasurer.

The Bull Milking Machine Co., Fort Atkinson, Wis., has been incorporated with a capital stock of $100,000 by Lionel Bull, John J. Urban and John W. Meyer. It will equip a plant for the manufacture of patented automatic milking machines and other dairy farm appliances and devices.

The Mitchell Mfg. Co., Milwaukee, manufacturer of metal barn equipment and agricultural devices, has started operations in a new foundry department at Twenty-ninth and Forest Home avenues, erected and equipped at a cost of about $45,000, and available for gray iron, brass and aluminum castings in small sizes.

The city of Kenosha, Wis., will build a municipal garage and service shop for city-owned motor vehicles, 50 x 120 ft., one story and basement, and cost about $25,000.

The Jungers Stove & Range Co., Grafton Wis., has plans for a three-story addition, 61 x 165 ft., of brick and concrete, with steel sash, to be used as a machine and assembling shop, warehouse, shipping room, etc. The investment in building and equipment will be about $65,000.

The Superior Manufacturers, Inc., Superior Wis., recently incorporated, is equipping a factory at First Street and Hughitt Avenue, for the manufacture of talking machines, phonographs and other musical instruments. The officers are: President, Lief Larson; vice-president, C. T. Robinson; secretary and treasurer, Oliver W. Johnson.

The Termaat-Monahan Mfg. Co., Oshkosh, Wis., has completed a brick and steel addition, 40 x 100 ft., to its gray iron foundry, and a stock and storage room, 50 x 100 ft., providing a daily capacity of 20,000 lb. of castings. Further improvements and enlargements are planned to effect an increase of 200 per cent in production by July 1, 1921. It manufactures gasoline engines, portable drag saws and other equipment, besides doing a jobbing foundry and machine shop business. George H. Mueller is vice-president and general manager.

The Northwestern Factory Supply Co., Milwaukee, has filed articles of incorporation with a capital stock of $25,000 to manufacture metal and wood-working machinery, transmission equipment, machinist and mill supplies, etc. The incorporators are Everett E. and Irving R. Gillette, and Robert G. McClintock, 2908 Clarke Street, all of whom have been associated with similar enterprises in Milwaukee for many years.

The Milwaukee Chaplet Co., Milwaukee, has been incorporated with a capital stock of $12,000 to manufacture chaplets and other foundry specialties. In addition to Paul F. Rice, the incorporators include Alfred M. Jones, president, and Orra L. Hollister, vice-president Foundrymen's Supply Co., 302-308 Detroit Street, Milwaukee.

Doelger & Kirsten, Milwaukee, manufacturers of alligator shears and other metal cutting equipment, on Sept. 1 took occupancy of their new works, 100 x 200 ft., at Thirtieth and Chambers streets. The site is 130 x 250 ft. The plant is equipped for building shears in five sizes, from a small device for concrete contractors, weighing 2500 lb., to a 6-in. shear weighing 43,000 lb., capable of cutting rails cold. Charles H. Doelger and Oscar F. Kirsten are the proprietors and active managers of the business.

The Milwaukee Grey Iron Foundry Co., West Milwaukee, Wis., has been incorporated with a capital stock of $75,000 to manufacture machine metal castings and metal goods. The promoters are George M. McGregor, Benjamin Boelke and Arthur F. Schroeder. Detailed plans will be announced shortly.

The Neillsville Auto Co., Neillsville, Wis., has engaged Balch & Lippert, architects, Madison, Wis., to design a two-story-garage and service building, 90 x 114 ft., estimated to cost $45,000. A small list of miscellaneous tools and fixtures will be required.

The Twin Ports Steel & Tractor Co., Superior, Wis., has been incorporated with a capital stock of $10,000 by F. J. Broghammer, A. R. Hollom and K. E. Hollom, Superior, to manufacture tractors and tractor parts and accessories.

The Globe Metal Products Corporation, Sheboygan, Wis., on Sept. 1 placed in operation its new gray iron shop, 120 x 210 ft., erected and equipped at a cost of approximately $175,000. The cupola has a capacity of 75 tons in 24 hours and is equipped with Wilbrahan-Green blowers and Sullivan compressor. The company is an outgrowth of the Globe Foundry & Machine Co., now known as the Globe Co. It will make soil pipe a chief product, but also do a jobbing business in gray iron castings. The officers are: President, G. F. Honold; vice-president, Frank Diehl; secretary, C. A. Wagner; treasurer, G. A. DeWilde, Jr. The authorized capital stock is $250,000.

The Outagamie Lime Stone Co. of Black Creek, Wis., has been organized by J. R. Walker and C. B. Rix to take over and operate large limestone quarries in that vicinity. It is incorporated for $100,000 and will invest from $60,000 to $75,000 in new equipment and machinery. F. A. Maas, Black Creek, is president and general manager.

The Automatic Mfg. Co., Milwaukee, capitalized at $15,000, has been organized by Adolph A. Kern and William R. Johnstone to manufacture automatic devices and appliances. Provision for a factory and warehouse is now being made.

The Pacific Northwest

SEATTLE, Aug. 31.

A recent survey of industrial plants in this city engaged in ship repair, machine shop, foundry, steel and boiler-making, engine, shop, chain-making and car manufacturing, shows a gain of several thousand employees in the past three months. This indicates the gain of pre-war activities, following the cessation of steel shipbuilding, and shows a steady, normal growth rather than a condition of dependency upon one great industry.

H. D. Miller and C. O. Windle, Kelso, Wash., plan the construction of a new four-machine shingle mill near Kelso.

The Alco Wood Products Co., Albany, Ore., whose plant was recently destroyed by fire, will immediately rebuild.

The British Columbia Cement Co., Victoria, B. C., plans to overhaul and repair the Bamberton Cement Works for operation at capacity. New equipment will be installed and the present machinery, which has been idle for two years, will be repaired.

The Eugene Lumber Products Co., Eugene, Ore., recently organized, contemplates the establishment of a plant for the manufacture of lumber products and a side line of hardware and small machinery.

The A. W. Carlson Co., Seattle, recently organized, has taken over the Duwamish shipyard, and will build small boats, tow boats and do repair and reconstruction work.

The Gulf States

BIRMINGHAM, Sept. 6.

The General Equipment & Welding Co., McComb, Miss., has plans under way for a new one-story machine shop, 40 x 135 ft. W. R. Meeder is manager.

Fire, Aug. 23, destroyed the pumping plant of the Louisiana Oil & Refining Co., Moor Lingsport, near Shreveport, La., with loss estimated at $20,000. It will be rebuilt.

The Violet Ice & Electric Co., Violet, La., recently organized, is planning for the erection of a new electric power plant. Eri Vaughn is president.

The Farmers' Gin Co., Floydada, Tex., is planning to build a new one-story cotton gin, to cost about $30,000. W. L. Boerner is secretary and treasurer.

C. S. Reynolds, San Benito, Tex., will rebuild his cotton ginning plant, recently destroyed by fire with loss estimated at $85,000, including machinery.

The Birmingham Metallic Casket Co., Birmingham, Ala., recently organized, has secured a plant and desires quotations on machinery.

The capital stock of the Kilby Pipe & Foundry Co., Birmingham, Ala., has been increased from $30,000 to $100,000.

California

LOS ANGELES, Aug. 31.

The Stockton Tractor Co., Stockton, Cal., is having plans prepared by Frederick S. Harrison, architect, People's Bank Building, Sacramento, Cal., for the erection of a new one-story brick and concrete plant at West Sacramento, to cost about $75,000.

The Hollywood Guarantee Auto Repair Shop, Hollywood, Cal., have been organized to operate a machine shop for parts manufacture and repairs at 6028 Hollywood Boulevard. L. I. Karlson, 5654 Fountain Avenue, heads the company.

Kennedy & Kirchner, Fresno, Cal., have completed negotiations with the Board of Trade, Tulare, Cal., for the establishment of a new brick manufacturing plant on South M Street. Molding and pressing machinery and auxiliary equipment for a daily capacity of about 15,000 brick will be installed.

The Cass Mfg. Co., 332 South Spring Street, Los Angeles, has acquired property at Edwin, Cheney and Minerva streets for the erection of a new plant to manufacture metal products, including heating and ventilating equipment, hotel and kitchen metalware, etc. The first unit will be equipped for general metal-working and foundry operation. Machinery will be purchased at an early date. H. B. Cass is head.

The Haverford Cycle Co., Los Angeles, has been incorporated with a capital of $50,000 by Samuel Redmond, Samuel Eidelson and Hubert Starr, 309 Stimson Building, to manufacture motorcycles, bicycles and parts.

Louis Blum, 840 Page Street, San Francisco, has filed plans for a new one-story machine shop at 65 South Eddy Street, to cost about $10,000.

The Gem Accessories Corporation, 510 American National Bank Building, San Francisco, manufacturer of metal products, has completed plans for a new one-story foundry on East Adeline Street, Oakland, Cal.

The Central South

ST. LOUIS, Sept. 6.

The Bowen Motor Railway Co., Title Guarantee Building, St. Louis, manufacturer of electric railroad equipment, will soon call for bids for its new plant to cost about $375,000, including machinery. O. J. Popp, Odd Fellows Building, is architect.

The following companies are planning for the erection of new coal tipples at their properties: Ford-Elkhorn Coal Co., Regina, Ky.; Dye Coal Co., Pine Creek, Ky.; Defiance Coal Co., Defiance, Ky.; Blackburn Coal Co., Stone, Ky., and the Martha-Leslie Coal Co., Prestonburg, Ky.

The Cogswell Refining Co., Parsons Building, Henryetta, Okla., is perfecting plans for its new oil refinery, near Henryetta, on a 12 acre site. The initial plant will have a daily output of about 2000 bbl. and is estimated to cost about $250,000. J. C. Bertsch, Lucern Apartments, Tulsa, Okla., is engineer, and John F. Cogswell, president.

The American Elevator & Machine Co., 500 East Main Street, Louisville, has filed plans for a two-story building, 50 x 53 ft.

The Missouri, Kansas & Texas Railway Co., St. Louis, is awarding contracts for its new shops at Oklahoma City, Okla., including boiler plant, machine shops, power plant, engine house and other structures. F. H. Ringer is chief engineer.

The Price Evans Foundry Co., Chattanooga, Tenn., will soon take bids for a one-story building, 45 x 60 ft., to cost about $15,000.

The Jellico Cord Tire Corporation, Jellico, Tenn., recently incorporated with a capital of $1,500,000, has acquired a building which will be remodeled and enlarged at a cost of about $100,000. The machinery installation is estimated to cost a like amount. J. W. Mart, Akron, Ohio, is president and manager; Charles Hughes, secretary and treasurer. The Akron Engineering Co., Akron, Ohio, will be in charge of the work.

The Simon-Flynn Auto Top Co., Kansas City, Mo., has leased a two-story building, to be erected, 75 x 118 ft., for the establishment of a new plant for the manufacture of automobile tops, frames, etc.

The Walsh & Weidner Boiler Co., Grove Street, Chattanooga, Tenn., manufacturer of boilers, tanks, etc., has filed plans for a one-story foundry, 80 x 180 ft., to cost about $15,000.

J. M. Shook and C. F. Christopher, Knoxville, Tenn., are organizing a company to establish a plant for the manufacture of collapsible automobile wheel rims, cranks and other iron and steel specialties, estimated to cost $300,000, including machinery. A site is being selected.

Canada

TORONTO, Sept. 6.

The Foster Motor Car & Mfg. Co., Ltd., has recently been formed to manufacture the Foster motor car, to be equipped with the Herschell-Spillman motor. A site has been secured in the east end of Montreal, where a plant will be established. The head office will be at First Avenue and Ernest Street. Captain M. L. Fitzgerald will be in charge of the company.

The City Commissioners, Montreal, will build a new incinerator plant, at a cost of $200,000, to replace the one recently destroyed by fire. It is stated that construction will not start until spring, but plans and specifications will be prepared in the near future.

The London Concrete Machinery Co., London, Ont., recently changed hands, but will continue to manufacture concrete mixers, carts and contractors' equipment under the same name.

The Grand Trunk Railway, 211 McGill Street, Montreal, contemplates the construction of an interlocking plant at Woodstock, Ont., to cost $20,000.

Frank Behan, Extension, B. C., will build a sawmill at a cost of $75,000.

The Spruce Falls Pulp & Paper Co., Bradford, Pa., will start work at an early date on the erection of a pulp and paper mill at Kapuskasing, Ont., to cost $4,000,000. Fraser Brace & Co., Ltd., 83 Craig Street, Montreal, has the general contract.

The Ontario Steel Products Co., Gananoque, Ont., has increased its capital stock from $1,500,000 to $2,750,000.

The Bear River & Digby Electric Light, Heat & Power Co., Ltd., Bear River, N. S., has been incorporated with a capital stock of $50,000 by George H. Sedgewick, room 1007, 36 Toronto Street; Robert E. Fennell, Lawrence Kert and others, all of Toronto, to build and operate light, heat and power plants.

Engravers & Die Sinkers, Ltd., Toronto, has been incorporated with a capital stock of $40,000 by John Jennings, 67 Yonge Street; Frances Forsyth and others to manufacture machinery, metals, etc.

The Port Arthur Structural Iron Works, Ltd., Port Arthur, Ont., has been incorporated with a capital stock of $100,000 by Alexander J. McComber, Wallace A. McComber and others to manufacture structural material, wire products, etc.

The Cellular Pneumatic Tire & Rubber Co. of Canada, Ltd., Toronto, has been incorporated with a capital stock of $250,000 by Frank Regan, room 508, 12 Richmond Street East; John Callahan, Abraham Greenbaum and others, to manufacture automobile tires, tubes, etc.

The Canadian Western Door Co., Mission City, B. C., will build a sash and door factory to cost $60,000. C. C. Pierce is president.

The Tilbury Auto Body Co., Tilbury, Ont., is asking the Town Council for a loan of $40,000 to equip a factory for the manufacture of automobile bodies, etc. W. H. Hutton is interested.

SHORT TRADE ITEMS

The Canadian Baldwins', Ltd., Toronto, Ont., announce an intention of installing two 50-ton open hearth furnaces at the plant on Ashbridges Bay, Toronto. The company also stated that the two furnaces recently purchased at Collingwood, Ont., will be enlarged.

The new machinery store of the Reed-Prentice Co., the Becker Milling Machine Co. and the Whitcomb-Blaisdell Machine Tool Co., at 26-28 North Clinton Street, Chicago, was opened on Aug. 23. The floor space is 27 by 150 ft. and will be occupied by a full stock of the products of the companies. W. D. Creider is district sales manager in charge of the store and F. C. Hermann, formerly with the Stocker-Rumely-Wachs Co., Chicago, is sales representative.

Two 10,400 deadweight-ton cargo carriers, the Robin Adair and the Robin Hood, have been sold by D. E. Skinner, president Skinner & Eddy Corporation and head of the Robin Line, to Arthur R. Lewis, acting for the United States Steel Corporation, for a consideration of $3,000,000. The ships are oil burners, equipped with geared turbine engines, and are capable of making a speed of 11 knots.

Arrangements have been perfected for blasting out rock in the Calumet River south of One Hundred and Eleventh Street, Chicago. The improvement will permit lake vessels of heavy draft to reach the Interstate Iron & Steel Co. and other plants in the district.

The Midvale Steel & Ordnance Co. recently placed a contract with the Nicola Building Co., Pittsburgh, for the construction of 100 concrete five and six-room houses, which are to be erected at Rosemont, a short distance from the plant of the Cambria Steel Co., Johnstown, Pa. The houses are to be rented, or sold on easy terms to employees of the Cambria company.

Announcement is made of the organization of the Eastern Fuel Co., with a capital of $500,000, which will be affiliated with the Reilly-Peabody Fuel Co., and will form the eastern and export subsidiary of the latter company. Eugene S. Reilly is president, Lawrence A. Quinlivan, vice president and secretary, and Frank T. Peabody, treasurer of the new company, the general offices of which are located in the Frick Building, Pittsburgh, while the New York office is at 302 Broadway.

The Latin-American Division of the Bureau of Foreign and Domestic Commerce reports that an Argentine engineering and mining company in Buenos Aires can supply for export 200 tons of manganese ore per month if it can find a market. The company is now mining and grinding 200 tons of ore per month for local consumption, and is preparing to double its production.

The Guyana Gold Placer Co., on whose estates in Surinam, Dutch Guiana, extensive iron ore deposits are said to have been discovered at the Donderbariberg, now announces that manganese ore has been found in two places on the same field, accompanying ore in quartz veins. The ore occurs in the veins as a thin layer or as an irregular string between the quartz.

A serious situation has developed throughout the Sheffield, England, engineering and steel industry in consequence of the dispute between the members of the Electrical Trade Union and the management of a works at Penistone. The dispute has arisen, says the London *Ironmonger*, over the refusal of one man, who until recently was a member of the trade union, to resume his membership of the union on his promotion to the position of foreman. The Employers' Federation supports his action in declining to rejoin the Electrical Trade Union, and contends there should be no compulsion used in respect of staffs joining trade unions.

The I. Lanski & Son Scrap Iron Co., 2117 South Jefferson Street, Chicago, has purchased nine acres between Thirty-fourth and Thirty-fifth streets, Lawndale Avenue and the Illinois Northern Railroad, which it will improve with a new plant, a storage house and switch track with locomotive cranes for handling iron and steel scrap, at a cost of $100,000.

According to the returns of the Algerian Customs House authorities, the exports of iron ore from Algeria totaled 782,805 tons in 1919, 759,217 tons in 1918, and 1,065,512 tons in 1917.

The W. L. Romaine Machinery Co., 214 Sycamore Street, Milwaukee, jobber and dealer in new and used machine tools, mill and factory equipment and supplies, has increased its authorized capitalization from $50,000 to $125,000. New capital will be used to take care of increased business. W. L. Romaine is president and general manager.

A French group is reported to have applied to the government of the Caucasian Republic of Georgia for the concession to build a hydraulic station on the River Kur for supplying electric energy to the manganese mines at Tchiatury. The same group intends to take up the manufacture of ferromanganese on the spot.

Freyn, Brassert & Co., engineers and constructors, Chicago, are to install a Dorr thickener in connection with the gas-washing plant of the Shenango Furnace Co. at Sharpsville. This installation is to clarify the waste water from the existing gas washers and recover the flue dust removed from the gas for utilization in the blast furnaces. They have also been retained to take care of the installation of Steese hydro-carbon burners for the utilization of charcoal-tar in the open-hearth furnaces of the Stora Kopparbergs Bergslags Aktiebolag, Borlange, Sweden.

The Mesta Machine Co. has opened an office in the Singer Building, New York, from which point all its foreign business will be handled. Foreign correspondence should thus be addressed to the company at New York. The New York office will also be the sales office for the New York and Eastern states territory. M. M. Moore, export sales manager, who has returned from a several months European trip, will be in charge.

The Duquesne Steel Products Co., Inc., dealer in iron and steel products, has just been organized by W. C. Rice, D. J. McLaughlin and W. H. McAfee. The offices of the company are located in 609 Oliver Building, Pittsburgh. It will be sales representative in western Pennsylvania for the Superior Sheet Steel Co., Canton, Ohio.

The Electric Arc Cutter and Welding Co., formerly at 222 Halsey Street, Newark, N. J., has been reorganized and has moved to 152 Jeliff Avenue, Newark. The officers of the company, which manufactures Alternarc apparatus and electrode accessories and supplies, and does contract and job welding, are as follows: A. L. Livermore, president; C. J. Holslag, chief engineer and general manager; A. D. T. Libby, secretary and treasurer, and H. W. Livermore, assistant manager.

The Dawson-Rouillard Tool Corporation is the new name of the Rouillard Tool Corporation, which will now be located at Fifty-first Street and Lancaster Avenue, Philadelphia. The company is a maker of tool holders, rivet sets, pistons, punches and other tools.

Changes in the manufacture of the Swaco hopper car wrench to make the parts interchangeable are announced by the Safety Wrench & Appliance Co,. Thirteenth and Cherry streets, Philadelphia.

The Worcester Abrasive Co., Inc., has moved its executive offices from 108 Union Square to 1662 Broadway, New York.

The Cleveland Engineering Society on Aug. 10 voted to become a charter member of the Federated American Engineering Societies.

The Department of Commerce has published a cablegram officially confirming the report of the intention of the Mexican Government to install immediately 30 new wireless stations. The approximate cost will be 500,000 pesos.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined iron, base price	5.75c.
Swedish bars, base price	20.00c.
Soft Steel:	
¾ to 1⅞ in., round and square	3.63c. to 5.40c.
1 to 6 in. x ⅜ to 1 in.	3.63c. to 5.40c.
1 to 6 in. x ¼ to 5/16	3.73c. to 5.40c.
Rods—⅝ and 11/16	3.68c. to 5.45c.
Bands—1½ to 6 by 3/16 to No. 8	4.33c to 7.00c.
Hoops	5.68c. to 7.00c.
Shapes:	
Beams and channels—3 to 15 in.	3.47c. to 4.80c.
Angles:	
3 in. x ¼ in. and larger	3.58c. to 4.80c.
3 in. x 3/16 in. and ⅛ in.	3.83c. to 5.75c.
1½ to 2½ in. x ⅛ in.	3.63c. to 5.55c.
1½ to 2¾ in. x 3/16 in. and thicker	3.58c. to 5.50c.
1 to 1¼ in. x 3/16 in.	3.63c. to 5.55c.
1 to 1¼ x ⅛ in.	3.68c. to 5.60c.
⅞ x ⅞ x ⅛ in.	3.73c. to 5.65c.
¾ x ⅛ in.	3.78c. to 5.70c.
⅝ x ⅛ in.	4.18c. to 6.50c.
½ x 3/32 in.	5.28c. to 7.20c.
Tees:	
1 x ⅛ in.	3.98c. to 5.90c.
1¼ in. x 1¼ x 3/16 in.	3.88c. to 5.80c.
1½ to 2½ x 3/16 in. and thicker	3.68c. to 5.60c.
3 in. and larger	3.63c. to 5.30c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	5.40c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	5.90c.
Toe calk, ½ x ⅝ in. and larger	6.00c.
Cold-rolled strip (soft and quarter hard)	12c. to 14c.
Open-hearth spring steel	7.00c. to 10.00c.
Shafting and Screw Stock:	
Rounds	6.25c. to 7.00c.
Squares, flats and hex	6.75c. to 7.50c.
Standard cast steel, base price	15.00c.
Best cast steel	20.00c. to 24.00c.
Extra best cast steel	25.00c. to 30.00c.

Tank Plates—Steel

	Per Lb.
¼ in. and heavier	3.78c. to 4.80c.

Sheets

Blue Annealed

	Per Lb.
No. 10	7.23c. to 8.30c.
No. 12	7.26c. to 8.35c.
No. 14	7.33c. to 8.40c.
No. 16	7.43c. to 8.50c.

Box Annealed—Black

	Soft Steel C.R., One Pass Per Lb.	Wood's Refined, Per Lb.
Nos. 18 to 20	8.41c. to 9.90c.	
Nos. 22 and 24	8.46c. to 9.85c.	10.80c.
No. 26	8.51c. to 9.90c.	10.85c.
No. 28	8.61c. to 10.00c.	11.00c.
No. 30	8.71c. to 10.10c.	

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	8.86c. to 11.00c.
No. 16	9.11c. to 11.25c.
Nos. 18 and 20	9.26c. to 11.40c.
Nos. 22 and 24	9.41c. to 11.55c.
No. 26	9.56c. to 11.70c.
No. 27	9.71c. to 11.85c.
No. 28	9.86c. to 12.00c.
No. 30	10.36c. to 12.50c.

No. 28, 36 in. wide, 20c. higher.

Pipe

Standard—Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
½ in. Butt..	—34	—17	¾-1½ in. Butt.	— 3	+17
¾-3 in. Butt.	—38	—22	2 in. Lap.....	+ 3	+21
3½-6 in. Lap.	—33	—18	2½-6 in. Lap..	+ 1	+17
7-12 in. Lap..	—23	— 6	7-12 in. Lap..	+12	+30

Steel Wire

Base Price* on No. 9 Gage and Coarser	Per Lb.
Bright basic	10.00c.
Annealed soft	10.00c.
Galvanized annealed	10.75c.
Coppered basic	10.50c.
Tinned soft Bessemer	12.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	28¼c. to 29½c.
High brass wire	28¼c. to 29½c.
Brass rod	26¾c. to 29 c.
Brass Tube	43½c. to 45½c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 29½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin Grade "AAA" Charcoal 14x20	Bright Tin Grade "A" Charcoal 14x20	Coke—14x20	Primes	Wasters
		80 lb...	11.80	11.55
		90 lb...	11.90	11.65
		100 lb...	12.00	11.75
IC...$16.50	$14.25	IC...	12.25	12.00
IX... 18.75	16.25	IX...	13.25	13.00
IXX... 20.50	18.00	IXX...	14.25	14.00
IXXX... 22.25	19.75	IXXX...	15.25	15.00
IXXXX... 23.75	21.50	IXXXX...	16.25	16.00

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$9.35
IC	9.50
IX	10.50
Fire door stock	12.75

Tin

Straits pig	49c.
Bar	60c. to 62c.

Copper

Lake ingot	20c.
Electrolytic	19¾c.
Casting	19½c.

Spelter and Sheet Zinc

Western spelter	10c. to 11c.
Sheet zinc, No. 9 base, casks	14½c. open 15c.

Lead and Solder*

American pig lead	10c. to 11c.
Bar lead	12c. to 13c.
Solder ½ and ½ guaranteed	38c.
No. 1 solder	35c.
Refined solder	31c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	90c.
Commercial grade, per lb	50c.

Antimony

Asiatic	9 to 10c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	35c. to 38c.

Old Metals

Prices generally are a little lower this week and business very quiet. Dealers' buying prices are as follows:

	Cents per lb.
Copper, heavy and crucible	15.25
Copper, heavy and wirec	14.25
Copper, light and bottoms	12.75
Brass, heavy	9.50
Brass, light	7.00
Heavy machine composition	15.00
No. 1 yellow brass turnings	9.00
No. 1 red brass or composition turnings	12.25
Lead, heavy	7.50
Lead, tea	5.00
Zinc	5.25